BULLETIN

OF THE

AMERICAN GEOGRAPHICAL SOCIETY.

Vol. XXXVII 1905. No. 5

# THE PHILIPPINE CENSUS.

BY

BY HENRY GANNETT.

The report of the census of the Philippine Islands, taken in March and April, 1902, has recently been issued. It consists of four octavo volumes, comprising three thousand pages, and is freely illustrated with statistical maps and diagrams, and with half-tone plates especially devoted to the peoples of the Archipelago.

The first volume of the report consists of a geographical description, the most noteworthy feature of which is that the Archipelago includes 3,141 islands, counting as a separate island every elevation above high water. It is probable that upon the completion of an accurate survey the number will be greatly increased. A table gives the names and areas of islands of more than one-tenth of a square mile in area.

The land area of the Archipelago is given as 115,026 square miles. The largest island is Luzon, with an area of 40,969 square miles. Mindanao is second in size, with 36,292 square miles.

The forest wealth is discussed, and, from a very rough estimate, it appears that the amount of standing timber exceeded 1,000 billion feet, B. M.—an amount more than double that of Oregon and Washington, and of far greater value per foot, since the wood is of species valuable for cabinet work and inside finishing. A table of altitudes is appended. An account is also given of the mineral resources, from which it appears that the possibilities in the way of mineral development are very great, especially in iron, coal, and copper.

The geographical description is followed by an account of the climate, written by Father José Algué, the well-known scientist, director of the Weather Bureau and of the Manila Observatory.

As to temperature, the year may be divided into three seasons—cool, wet, and dry, the first extending from November to March, the dry from March to June; while July, August, September, and October are the wet months. Upon the eastern Pacific coast the rainfall is almost incessant, being occasioned by the trade-winds. The western coasts are comparatively dry during the prevalence of trade-winds, but the southwest winds, or monsoons, produce a wet season in the parts of the Archipelago exposed to them—*i. e.*, from July to October.

The movement of the winds is seasonal, northeast trades prevailing from November to June, and southwest monsoons during the remainder of the year. During this period typhoons are very common, originating in the Pacific to the eastward and crossing the Archipelago in a westward course, which changes to northeast in the China Sea. The paper gives maps of rainfall and temperature, and wind roses and diagrams showing the course of the typhoons.

Following this is a paper by Father Masó, of the Manila Observatory, upon earthquakes and volcanoes.

Next comes the History of the Islands under Spanish Domination, by Pardo de Tavera, of the Philippine Commission, and finally a series of papers, partly historical and partly ethnological, upon the various tribes, the principal writer being Dr. D. P. Barrows, formerly chief of the Ethnological Bureau, and now Superintendent of Education.

With the exception of the Negritos, the original inhabitants, who still exist to the number of about twenty-three thousand, and the white and yellow immigrants, the people of the Philippine Islands consist entirely of Malays. The idea that certain of the wild peoples of Mindanao are of Indonesian origin is not accepted by Doctor Barrows; on the contrary, he finds the people very homogeneous. He classifies the civilized peoples into eight so-called tribes: the Tagalogs of central Luzon; the Ilocanos and Cagayans of northern Luzon; the Zambalans on the peninsula of Zambales; the Pampangans and Pangasinans of central Luzon; the Bicols of southern Luzon, and the Visayans, inhabiting the Visayan Islands and northern Mindanao.

The wild peoples have been grouped by various writers, notably by Blumentritt and the Jesuit fathers, into a large number of tribes. Doctor Barrows finds no such differences among them as would warrant this minute subdivision, but reduces the number to eighteen, and suggests that further study may decrease this number. The criterion of language is of little value in deciding this matter,

since there are few differences in the languages spoken by the various tribes, either Christian or wild, and these differences are of such varying degree that it is very difficult to say what degree of difference shall be regarded as constituting a tribe. The criterion of manners and customs and of physique is not of much value, since these characteristics do not vary greatly among the wild tribes. In the sense of organization there is no such thing as a tribe. With few exceptions, one village is like another. In a few cases only, and these among the Moros, does any organization beyond the village exist, and a *tribe*, in our meaning of it when speaking of our North American Indians, is unknown.

Doctor Barrows recognizes the Moros as a distinct people, the distinction resting on the fact that they are Mohammedans. For ethnological purposes he would divide the Moros into several groups, depending on their habits and degree of civilization. Nearly all the people of northern Luzon he throws into one group under the name of Igorotes, although this people have been subdivided into many tribes by other writers. The wild people of the interior of Mindanao, who appear under many names in the writings of the Jesuit fathers, he groups into half-a-dozen tribes, but with the pertinent suggestion that he sees very little difference among them, and may, upon further study, conclude to group them all together. These are the Subanos, Mandayas, Bagobos, Manobos, and others. The Negritos are sharply distinguished from the other peoples, except where the blood has been mixed; and it may be added that a large proportion of the Negritos contain Malay blood.

The manners and customs, the life, and the utensils of these peoples are described by men who have travelled and lived with them; for during the five years that the United States have had jurisdiction over the Archipelago, Americans have traversed the Islands from end to end, and there are but few nooks and corners into which they have not penetrated.

The history written by Pardo de Tavera cannot fail to be interesting and authoritative. The most salient feature in the domination of the Islands by the Spaniards was the part taken by the friars. It was not long after the pacification of the Archipelago in the sixteenth century that the people were apportioned in parishes to the Church Orders and their representatives, each having a parish in charge, and these representatives became not only the spiritual but the temporal guide and authority of that people. All matters, from salvation to the planting of rice, were under the control of the friar of the parish. He was priest and civil administrator and judge

as well, and to maintain his power he kept the people in ignorance, especially of the Spanish language, and by this means he became the sole go-between from the people to the Government. It was this domination which produced the opposition of the people to their spiritual advisers, and finally led to the insurrection. In pointing out these facts, however, it must not be overlooked that whatever degree of civilization and education these people acquired they received from the friars,and while they had many grievances against them, they had also much to be grateful for.

The total population of the Archipelago is 7,635,426, of which 6,987,686 are classed as civilized and 647,740 as wild, the criterion of civilization being Christianity. With the exception of the people of foreign birth, all the people are Catholics. Of the wild peoples, about two-fifths are Mohammedans and are grouped as Moros.

From the time the Filipinos were brought under the influence of the Catholic Church, the number of Christian inhabitants has been thoroughly well known; for each friar knew the number, sex, age, and conjugal condition of the members of his parish, and recorded every birth, marriage, and death, so that at any time it has been possible to state the total number of civilized inhabitants with a high degree of accuracy. The uncertainty regarding the total population of the Philippines has its origin in the utter ignorance of the number of the wild peoples, recent estimates ranging from seven to fourteen millions.

Censuses of the Christian peoples were made by the Spanish Government in 1877 and in 1887. These show the total number classified by sex only.

Selecting from among the estimates of population in past times such as appear to include the civilized people only, and which are probably complete, the rate of growth for the past century has been obtained. At the close of the eighteenth century the civilized population was about one and one-half millions; it is now but little short of seven millions. The average rate of increase in this time has been one and one-half per cent. per year, which is three-fourths the rate of growth in the United States at the present time, and a little more than half as great as the rate of growth in this country during the past century.

The only other Malay people of which we have a census is that of Java, and in that island the rate of growth during the past century has been more rapid than in the Philippine Archipelago. The increase among the Filipinos has not been uniform. It has been rapid for a period of years, followed by a reduction, owing to

the prevalence of some epidemic. In the past century the Islands have been visited many times by cholera, which, when it appears, wipes out in a few months the gain of several years. But notwithstanding these epidemics, on the whole the growth of population has been more rapid than in any European country excepting Russia and, possibly, Denmark.

The average density of population is 67 per square mile. The population is not, however, uniformly distributed, being grouped in villages near the coast. Of the entire number two-thirds live in towns bordering on the shore, and the greater part of those in the interior are found in the great valley of Luzon stretching from Manila up to Lingayen Gulf, and in the Cagayan Valley on the same island. In the most densely populated of the provinces, Ilocos Sur, there are 400 inhabitants to the square mile—about the same as in the State of Rhode Island. The island of Cebú is almost as densely settled. About one-half of the population of the entire Archipelago is found in Luzon. The great island of Mindanao, which is second in area, contains less than half a million people.

There is no classification into urban and rural peoples. The inhabitants are grouped in towns and villages, a scattered population being almost wanting. There are in the Philippines about 13,400 *barrios*, as the villages are called, ranging in size from Manila, with 220,000 inhabitants, to hamlets of a score or two of people. Nearly one-third of the entire number of villages has less than 200 inhabitants each, and no less than 85 per cent. have less than 1,000 each, and these villages of 1,000 or fewer inhabitants contain about three-fourths of the entire population of the Archipelago.

The great city is, of course, Manila, and it is to the Philippines what London is to England or Paris to France. There is no other town with one-tenth of its population, and there are but four with a population greater than 10,000, these being Laoag in Ilocos Norte, Iloilo, Cebú, and Nueva Cáceres, the largest of which has less than 20,000 inhabitants.

The civilized population is extremely homogeneous. No less than 99.2 per cent. were born in the islands. The Chinese number only 41,000, and form three-fourths of the foreign element. The people born in the United States number slightly over 8,000, and are second to the Chinese; while all other nationalities together contribute fewer than this country. Of all the foreign-born elements, about one-half of each nationality is found in Manila, the

remainder being scattered over the Archipelago. The foreign-born of Manila constitute a little more than one-eighth of the population of the city.

What has been said regarding birthplace is nearly duplicated by the facts concerning colour. Over 99 per cent. of the people are brown, six-tenths of one per cent. are yellow, and two-tenths of one per cent. are white.

The schedules classify the native population by tribes. Of the civilized people the Visayan is far the most numerous, comprising nearly one-half of the Christian inhabitants. The Tagalogs form a little more than one-fifth, and the Ilocanos about one-eighth. Of the wild peoples, the Moros constitute about two-fifths and the Igorotes about one-third.

There is in the report a map showing the locations of the different tribes, both civilized and wild. This map, prepared by plotting the census returns by towns and villages upon a large-scale map, shows with far greater certainty and definition than ever before the habitation of the different peoples. The tribes, as a rule, occupy compact areas, none of them, with a single exception, showing any tendency to migrate. The Ilocanos, who settled originally on the northwest coast of Luzon upon a narrow strip of land at the foot of a mountain range, have been forced by over-population to change their abode, and large settlements of them are now found in the Cagayan Valley and in parts of the great valley of Luzon, and even upon the Zambalan coast, at great distances from their original habitat.

The population is divided very nearly equally as to sex, the males being slightly in excess in the total population, while, if the brown people only be considered, the females are slightly more numerous.

The Filipinos are not long-lived. At the time of taking the census the average age was 23.9 years, which is 2.4 years less than the average age of the people of the United States and slightly greater than that of the negroes of this country. The proportion of children under one year of age was small, being slightly less than in the United States, but much greater than in Cuba. The disturbed condition of the Islands and the prevalence of cholera probably account for this small proportion. That of children under ten years of age, on the other hand, was large, being considerably greater than in the United States, and exceeded but slightly by Porto Rico. The proportion of people of extreme age was represented as being large; but investigation showed that in

nearly all cases the persons reported as eighty years old and over had exaggerated their ages, as is so often done by the ignorant.

Of the civilized population, 56.4 per cent. were reported as single, 33.1 per cent. as legally married, and 3.3 per cent. as consensually married, while the widowed constituted 7.2 per cent. The proportion of single was smaller than that of almost any country. The proportion of married was large, and if those consensually married be added it is very large, being exceeded in but few countries. The proportion of the widowed was very great, exceeding that of nearly every country. Two-thirds of the widowed were females, showing that in the Philippine Islands as elsewhere, widowers in taking a second partner choose maids rather than widows.

The question of literacy is one of great interest and importance. More than half, or 55 per cent., of the civilized people over ten years of age could neither read nor write, leaving 45 per cent. who could read, it being understood that this means in any language. As a matter of fact, by far the greater part of the literacy among these peoples is in the Malay tongues, since only a very small proportion of them could read Spanish. Those who were able to read may be divided into two classes: first, those who could read only; and second, those who could both read and write—and those of the latter class formed about one-fifth of the inhabitants ten years old and over. It is seen that of those who could read, less than half could also write, showing that education under the Spanish, which was carried on by the friars in great part, was limited to teaching the children to read. The proportion of inhabitants who could read and write is almost identical with that of Porto Rico.

Distributing the literates by sex, another interesting fact is developed. Of all males 47 per cent. could read, and of all females 42 per cent.; but when we consider the proportion able to read and write, it appears that 30 per cent. of the males were thus far educated, while only 10 per cent. of the females reached this degree of proficiency. In other words, it appears that while two-thirds of the males who were taught to read were also taught to write, only about one-fourth of the girls received an equal degree of education. In the United States, and even in Cuba and Porto Rico, the difference between the sexes in matters of elementary education is by no means as marked as in the Archipelago.

About one-fourth of the population consists of males of voting age. Of this class nearly one-third are able to read and write in some language, the vast majority, of course, in the Malay tongues only.

The occupations of the Filipinos are few in number, and present little variety. The people are essentially agricultural, the greater part devoting their time to farming. There is little co-operative work, little use for machinery, and still less of specialization of occupations. Most of the manufacturing is done by women in houses, with the simplest tools and appliances. Thus the beautiful cloths known as *jusi*, *piña*, and *sinamay*, are woven on hand looms, as cloth was woven in New England a century ago. In Manila there are a few large factories, including several for the making of cigars, one cotton mill, and several lumber mills, most of the lumber being sawed by hand with whip-saws.

A larger proportion of the population than in the United States or in Porto Rico are classed as wage-earners, being not less than 43.5 per cent. This large proportion is due to the great number of women workers. Classifying the wage-earners by sex, it is seen that of all males 57.6 per cent. are wage-earners, and of females 29.4 per cent. The proportion of the latter is two and one-half times that in the United States, and three times as great as in Cuba and Porto Rico.

Of the total wage-earners more than two-fifths are reported as engaged in agricultural pursuits. This exceeds the proportion in this country, but is less than that of Cuba. In domestic service the proportion is less than in Cuba, and only one-fifth that of the United States. The proportion engaged in trade and transportation is very small, while manufacturing pursuits include nearly one-third of all wage-earners. The proportion is larger than in this country, and more than double that of Cuba.

Turning to individual occupations, it appears that more than two-fifths are farmers or farm labourers, nearly one-fifth weavers and spinners, and about one-eighth day-labourers, 4.5 per cent. merchants, and 3.8 per cent. fishermen. These account for three-fourths of the wage-earning class.

The average Filipino family has 4.7 members, which is small for people in this stage of civilization, being equal to that of the United States in 1900, a little less than in Cuba, and decidedly less than in Porto Rico, in 1899. The small size of families is doubtless due to the ravages of cholera and the effects of recent insurrections.

The defective classes, including in that term the insane, blind, deaf, and deaf and dumb, are proportionately more numerous than in the United States. There are 220 insane in every 100,000 inhabitants, compared with 170 in this country. Of blind there

are 227 in each 100,000, which contrasts strongly with 81 in the United States. The deaf and dumb number 85 per 100,000, as compared with 66 in the United States, and of those who are deaf only there are no fewer than 332 in each 100,000 inhabitants.

Throughout the civilized communities there has been maintained an excellent registration of deaths. From all appearances it is, on the whole, as good as that of the registration area in the United States. Such a registration has been maintained by the Church for centuries under Spanish rule. Most of the early records have, however, been lost, but the Census Office succeeded in obtaining partial or complete records for the fifteen years between 1882 and 1897. For the census year, copies were made of the mortality records of the entire Archipelago. In addition to these, copies of the records for the year 1903 were also obtained. A study of the earlier records shows that under normal conditions, when no epidemic is present, the death-rate averages about 32 per 1,000 per year—a rate very near that of the negroes in this country. In 1902, however, the death-rate, owing mainly to the prevalence of cholera, ran up to the enormous figure of 63.3 per 1,000 inhabitants, or about double the normal. In 1903, when cholera was much less severe, the death-rate fell to 47.2 per 1,000—still, however, nearly 50 per cent. greater than the normal rate.

Among the males the death-rate was greater than among females. Among children it was very large. Of those under one year of age, it was 322 per 1,000—nearly double that of the same age in the registration area of the United States, 165, but considerably less than that of the negroes, 384. Among children under five years of age, the death-rate was 141 per 1,000, which contrasts strongly with the same class in the registration area of the United States, which was 52 per 1,000, and also exceeds the death-rate among the negroes of this country, 121. Among children under ten years of age, the death rate was 99 per 1,000. No less than 45 per cent. of the deaths in the Philippine Islands occurred under the age of ten years, as compared with 33 per cent. in the United States.

The greatest mortality occurs in the wet months, from July to October, and the least in the months of January, February, and March. Dividing the year into three seasons—the cool, warm, and wet—it appears that in the first there occurred 24.5 per cent. of the deaths of all the year; in the second period 28.4 per cent., and in the wet season there occurred 47.1 per cent., or nearly one-half of the total deaths. This excessive rate in the wet season is, however, in part a result of the cholera, which was at that time the most

severe, and which is not necessarily dependent upon the wet season, although affected to some extent by it.

The principal causes of death were cholera and malarial fevers, cholera being responsible for 31 per cent. and malarial fever for 27 per cent. of all the deaths in 1902. In that year tuberculosis of the lungs carried off 6 or 7 per cent., so-called epilepsy (which is more properly diagnosed as convulsions of children) caused more than 5 per cent. and dysentery and diarrhœal diseases account for 7 per cent.; smallpox between 3 and 4 per cent., *beriberi* (an anæmic disease unknown in this country) over 1 per cent., and other diseases in smaller proportion. Our most dreaded disease, pneumonia, is almost unknown in the Archipelago, and tuberculosis of the lungs, although it claims a few, is by no means serious. Bubonic plague, which in the previous year threatened to ravage the Islands, scarcely appeared in the death returns.

Cholera broke out in Manila in March, 1902. In eight months it had extended into every civilized province and into several military districts, spreading almost entirely over them. In seven provinces there was cholera in every pueblo, and in twenty-four others it appeared in a majority of the pueblos. During the year it claimed victims in 772, or more than three-fourths of the pueblos of the Archipelago. In Bataán the deaths from this cause for the year were 50 per 1,000; in Batangas, 40; in Ilocos Sur, 47; in Iloilo, 54, and in many municipalities the population was decimated by the disease.

Under the general title of "Education" the third volume contains papers by Señor Del Rosario on education during the Spanish régime and by Mr. Jernegan on the American public school system in the Archipelago. In the latter paper is included a history of the origin and development of the admirable public school system now maintained by the insular and local Governments.

The census schedules furnish a summary of the provisions for education as they existed at the time the census was taken, and of the extent to which the people have availed themselves of these privileges. The total number of schools was very nearly three thousand, of which 55 per cent. were public, a little over one-third were private, and the rest were religious schools, under control of the Church.

Of the total number of schools, 96.5 per cent. were of primary grade, and of this number 55.8 per cent. were public schools. Secondary schools were comparatively few in number, and the majority

of these were private or religious. Nearly all were day schools, those of a private character being very rare.

The total number of teachers was 5,925, of which the public schools employed not less than 62 per cent., and nine-tenths of all the teachers were in the primary grade. Of the total number, 82.7 per cent. were Filipinos, 13.2 per cent. were Americans, the remainder being Spanish and Chinese. As to sex, nearly two-thirds were men.

The number of pupils reported as attending school was 356,385, or about one-sixth of all the children of school age. This is a larger proportion than in Cuba, and almost as great as in Porto Rico. Three-fourths of these children were in the public schools, which fact is a convincing answer to the question asked by those who oppose the public school system. The teaching of English exclusively and these paration of the school from the Church are upheld in the Islands, as is shown by the fact that the parents of 75 per cent. of the children prefer that their children should attend public rather than religious or private schools.

Of the number attending school not less than 96 per cent. were in the primary grade. The schools were large, the average attendance per school being 120 pupils, the average teacher having charge of 60 children. These figures show the necessity of an increase in the number of schools and teachers. While in the United States the children are about equally divided as to sex, in the Philippines about three-fourths of the scholars were boys. It is a significant fact that of these school children the number who could use English was very nearly as great as that of those using the Spanish language.

The amount expended for schools during the school year ending in the spring of 1903 was about four million pesos, or, approximately, $1,750,000.

Pauperism is almost unknown. The wants of the people are few and easily supplied, and it is only in case of entire physical incapacity that any person is unable to provide himself with food and clothing. In such cases the unfortunate is usually cared for by his relatives, so that there are no almshouses. The total number of persons maintained, either in whole or in part, at public charge during 1902 was 1,668, or 24 per 100,000 of the population, which contrasts very strongly with 120 per 100,000 in the United States.

The number of persons convicted of crime during the same year was 12,312, and the number of such persons in confinement at

XUM

the close of the year was 5,395. This was less than 8 in each 10,000 inhabitants—a proportion less than in this country, where it was 13 to each 10,000 population. While comparisons concerning criminal statistics are extremely unsafe, this is certainly not a bad showing for the Philippines, especially when the unsettled conditions are considered.

All criminals sentenced for long periods are removed to Bilibid Prison, in the City of Manila. At the close of the year this prison contained 1,787 convicts. The principal crimes for which prisoners were incarcerated were murder, homicide and manslaughter, theft and robbery, and sedition.

Agriculture is the principal occupation. There are 815,453 farms, comprising an area of seven million acres, or twelve thousand square miles, which is about one-tenth of the area of the Archipelago. Of these seven million acres in farms slightly less than half were under cultivation.

The chief characteristic of the farming industry is the minute subdivision of land. The average farm covers only 8.57 acres, as contrasted with 147 acres in the United States. One-half the farms have an average area of 2½ acres, and more than one-fifth of them an average of only 1,000 square feet—the size of an ordinary city lot. The average cultivated area per farm is only four acres.

Of all the farms more than four-fifths are owned by the occupants, and nearly all of those occupied by tenants are rented for a share of the product.

The principal crops are hemp, tobacco, cocoa, sugar, coprá, rice, cotton, bananas, and sweet potatoes. A variety of fruits is raised, but not in large quantities; nor is the quality high, except in the case of mangoes. Philippine hemp, or *abacá*, is produced in all parts of the Archipelago where the rainfall is fairly continuous. It occurs both wild and under cultivation. Nearly all the crop is exported, and it is the chief article of export. Tobacco is raised mainly in northern Luzon, on the west coast, and in the valley of Cagayan River. Manila cigars are an important article of export to eastern Asia and Europe, but exports to the United States are small.

Sugar is raised in all parts of the Archipelago, but principally in the Visayan Islands. The islands of Panay and Negros contain many large plantations. Coprá, the dried meat of the cocoanut, is also an important article of export to Europe, where it is used in making cocoanut oil. Cotton is raised in limited quantities in northern Luzon, but nearly all the cotton goods used in the Islands

are imported. Bananas and sweet potatoes are grown everywhere, and form important elements of the native diet.

The following table shows in millions of kilograms the product of the above crops in 1902:

| | |
|---|---|
| Tobacco | 17.0 |
| Hemp | 66.7 |
| Coprá | 42.8 |
| Rice | 8.6 |
| Sugar | 180.2 |
| Sweet potatoes | 65.5 |

The principal farm animal is the caribao, or water buffalo. Other cattle, mainly from India, are used to a considerable extent. The native ponies are of small size, but are tough and willing, and are used for light draft. There are large numbers of swine, and pork is an important article of food.

The following table shows the numbers of live stock:

| | |
|---|---|
| Caribaos | 640,871 |
| Other cattle | 127,559 |
| Native horses | 142,992 |
| Swine | 1,179,371 |

It addition to the above there were a few Australian cattle and horses, and a few American horses and mules.

In Manila there are several large cigar factories which employ hundreds of workmen each. There is a large brewery and several small saw-mills. Aside from these, manufacturing is carried on in small establishments, with one, two, or half-a-dozen workmen, or by the women in their homes. The tables of the Census are restricted to establishments which produced in the census year (1902) a product valued at not less than five hundred pesos. All home manufacture was by this method excluded, and yet the entire textile manufacture, the manufacture of hats, mats, bags, etc., is thus carried on.

Under this definition there were 2,184 establishments, with an annual product valued at 35,000,000 pesos, or about fifteen million dollars. Chief among the products were cigars and cigarettes, with a value of 8,740,000 pesos; of liquors of various kinds, 2,478,000 pesos; food products, 2,228,000 pesos; and of lumber, 1,597,000 pesos.

Including branches of foreign banks, there were nine banking institutions in the Archipelago, all of which were located in Manila. Most of these have been established since the date of American

occupation. There were no local insurance companies, either fire, life, or marine, but 69 foreign companies have established agencies, mainly in Manila.

There is one railroad, which runs from Manila to Dagupan, a distance of 120 miles, with two or three small branches of trifling importance. It is a narrow-gauge road, and at the time of the census was owned by an English company. Other lines have been projected, and two of them are building. Aside from these railroads, inland commerce is carried on by boats wherever water transportation is possible.

But few of the rivers are navigable for vessels of any size. Even the Cagayan, one of the largest rivers, is navigable for small steam craft for a short distance only, and the tobacco crop of that valley is transported by *cascos* or by rafts to Aparri, at the mouth of the river.

There are but few good roads, and even these are practically impassable in the rainy season.

The country bordering on Laguna de Bay, however, is particularly well favoured in the matter of transportation, in the fact that the lake is everywhere navigable for *cascos*, and the Pasig River, connecting the lake with Manila, is navigable for this class of craft at all times.

The people live largely upon the coast, as has been noted elsewhere, and the inter-island commerce, carried on by small steamers, is very large, and centres principally in Manila.

There were only twelve public libraries, and these contained a little over four thousand books.

There were seventy hospitals, in which nearly twelve thousand patients were treated during the year. Most of these hospitals were established by the Philippine Government, owing to the prevalence of cholera and other diseases. Several excellent hospitals are also maintained by Church Orders.

The newspaper press is of little importance. There are forty-one newspapers and other periodicals published in various parts of the Archipelago, most of which are in English and Spanish, a few of them being in the native tongues. The total circulation of all is less than 70,000 copies, and more than two-thirds of the number are in the Spanish language. Notwithstanding this small circulation, about one periodical to a hundred persons, the reading of newspapers is rapidly increasing and the interest of the people in current events is becoming more widespread.

As stated elsewhere, the Christian people are almost entirely

Catholic, persons of other denominations being the white people scattered over the islands.

During the centuries of Spanish domination hundreds of fine stone churches were constructed, the value of which is very great.

The total number of churches of all denominations is 1,608, and their value 41,700,000 pesos. The capacity of these churches is more than 1,700,000 worshippers, or about one-fourth of the civilized population.

The estimated value in 1902 of all the property was 622,000,000 pesos, four-fifths of which was in real estate and one-fifth in personal property.

The taxes collected during the year 1902 amounted to a trifle over 10,000,000 pesos, the average rate of taxation being about 1.6 per cent. Notwithstanding the poverty of the people, there appeared to be little disposition to avoid the payment of taxes.

In the chapter devoted to Labor and Wages, towards the close of the fourth volume, valuable testimony is adduced to show that the popular opinion regarding the quality of Filipino labour is incorrect. The consensus of recent opinion is that the Filipino makes as good a labourer in most branches of work as the Chinaman, and that with good treatment and surroundings labour of good quality can be secured.

---

## THE DEPRESSION OF SISTAN* IN EASTERN PERSIA.

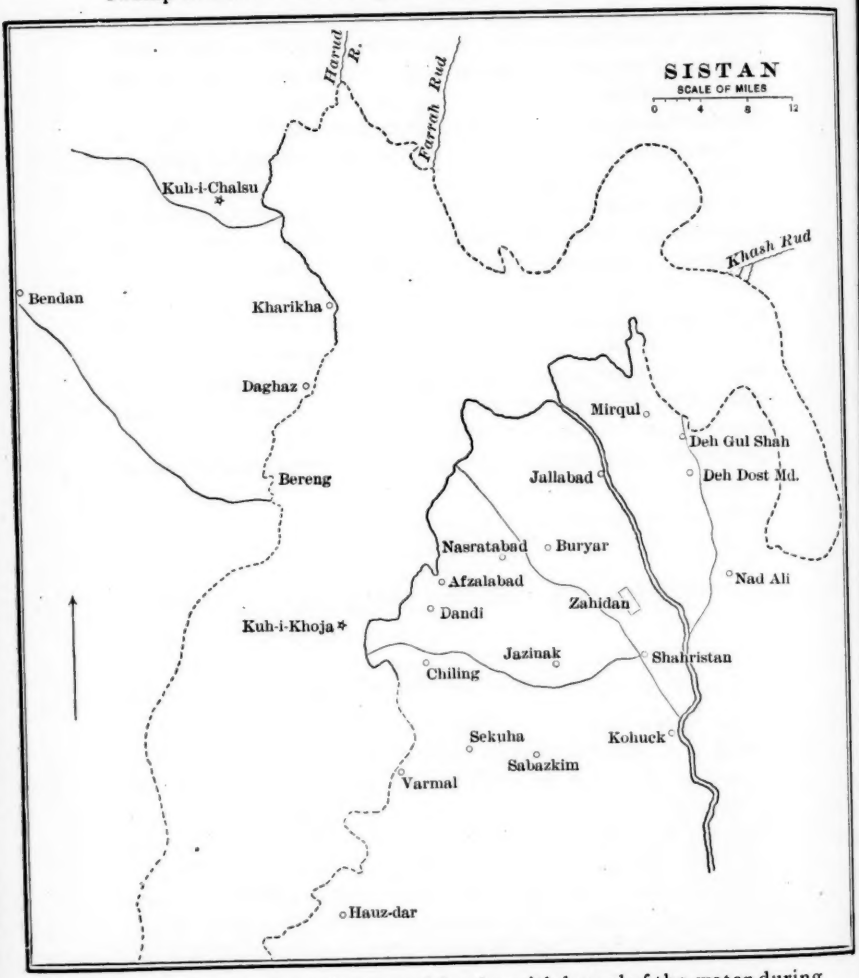
BY

ELLSWORTH HUNTINGTON.

Windy Sistan, once the proud home of Rustum, the Persian Hercules, is a poverty-stricken district near the distant corner where Afghanistan and Baluchistan join Persia. A variable lake and a swamp occupy the lowest portion of a mountain-girt basin five hundred miles in diameter; while adjacent to them on the east lies habitable Sistan. The lake is a shallow body of clear water, very slightly saline. Its size varies from almost nothing in times of drought to a diameter of sixty miles or more during floods. Both extremes are sometimes reached in a single year. The maximum depth does not exceed ten feet, according to the statements of the inhabitants of the shores, who pole their rafts to all parts.

* Mr. Huntington prefers this form to *Seistan*.

The swamp, which lies chiefly east and south of the lake, and is gradually encroaching far into it, consists of a dense growth of feathery-topped reeds from five to ten feet high. Outside the swamp comes the most important part of Sistan, an arable plain of




fine silt and clay left exposed by the withdrawal of the water during the gradual drying up of the lake. On the borders of what was formerly the lake-bed rises a rim of steep bluffs from fifty to four hundred feet high. Their level tops form the edge of a barren

plain, a desert of sand and gravel which completely encircles the inner, better-watered regions. To the west the desert, composed wholly of naked gravel, is only a few score miles in width; to the east, more sandy and silty, it stretches hundreds of miles, broken only by the narrow green depressions of the Helmund and other rivers. Lastly, outside the desert, rise the mountains, shutting their remote basin from the outer world. Those on the west and south are comparatively dry, and furnish no perennial stream; but on the north and east the perpetual snows of lofty Hindu Kush give rise to countless rushing brooks and rivers. Of all these only one, the Helmund, is always able to endure the aridity of the inner basin and reach Sistan perennially.

The varied zones of the basin of Sistan—namely, the lake, the swamp, the arable plain, the encircling desert, and the surrounding mountains—present physiographic types of the utmost diversity; it is to be expected that in response to such environment animate nature will present equally diverse autographic types. In a region of extreme aridity, such as Sistan, the relief of the earth's surface is the main factor in determining the presence or absence of water, and hence of life, both vegetable and animal. In the Sistan basin an abundant water supply is found on the edges among the high mountains, and in the centre, Sistan proper, which may be defined as the area anciently covered by the lake during its last notable expansion. In these two regions, therefore, life is abundant; while in the far greater area covered by the intervening desert it is very scarce.

The mountains west and south of Sistan lie one or two hundred miles from the lake. They reach heights of from five to ten thousand feet, and are covered with snow in winter. In early spring they produce a growth of short, sweet grass, excellent for sheep and camels. In summer, however, the grass dries up, the springs vanish, the running streams disappear or contract and become bitterly salt, and neither man nor beast can live. The human inhabitants of the region are of necessity nomads, dwelling in tents and journeying from place to place with their flocks. On the advent of a dry season they reluctantly leave the relative coolness of the mountains and migrate across the parched desert zone to the vicinity of the lake. Sistan is a fearful place in summer; but water abounds, and there are smooth plains of grain and grass to support man and beast. It is a "hell full of bread," as the people say; but that is better than the starving heaven of the mountains. Thus a considerable portion of the population of Sistan consists of nomad

Baluchis driven in by drought from the surrounding mountains and deserts. Some have settled in permanent villages as agriculturalists; but the majority wander from place to place, going to the cool mountains or the healthful desert whenever there is sufficient grass and water.

The other human inhabitants of Sistan are more permanent. Part of them, the Sistanis, are agriculturalists, inhabiting chiefly the delta of the Helmund River. The rest are a peculiar people, the so-called "Fowlers," or Sayads, who inhabit the swamp. Our habit of regarding deltas as smooth plains makes it seem almost absurd to speak of the relief of the delta of the Helmund as having a determining influence upon the conditions of life. Yet such is actually the case. To the eye the delta appears flat, but careful observation shows that, like others of its type, it consists of low, broad ridges, perhaps five or ten feet high and several miles broad, with corresponding hollows between. A main distributary of the river flows along a given radius, and during floods deposits silt, especially upon the inner portions of its flood-plain, until the stream flows on the top of a broad, smoothly-arched ridge, very flat, but very real. Then, during some flood, the stream breaks from its old course and follows a new radius, along which another ridge is built. The ridges of the Helmund delta can easily be detected, not by their relief, but by the character of their vegetation. They are dry and barren, with few plants except the prickly camel-thorn, a bushy weed with small reddish purple flowers. Villages are rare, and animals of any sort are almost absent. Sand-dunes abound, and are gradually encroaching over the whole area. The soil is rich and easily tilled; but most of it is now left unutilized, although abundant ruins show that this has not always been the case. The reason is not far to seek: the rainfall of Sistan is very light, and is limited to the winter months. Agriculture is utterly impossible without irrigation. It is an easy matter to lead water along the ridges in canals; but it does not pay, for the few feet of extra elevation raise the surface of the soil too far above the level of permanent underground water maintained by the lake. The roots of the plants cannot reach it. Hence more water is required for irrigation, and a drought is much more disastrous.

In the hollows the case is different. Where they are subject to flooding by the rivers in spring a dense jungle of tamarisks grows up to a height of twenty feet or more. It is frequently so dense as to be impassable, and furnishes splendid cover for unnumbered jackals, wild boars, and other smaller animals. The people realize

that water is close below the surface, and clear away the jungle for fields of millet, which grows luxuriantly along with the feathery young shoots of the quickly-sprouting tamarisk. Other hollows, not subject to inundation, are completely cleared and highly cultivated; and they, with the low-lying borders of the delta, are the places where grain grows best and men congregate most thickly. In winter and spring it seems as though the people of Sistan had chosen the most marshy, unhealthful, and impassably muddy portions of the delta for their villages; but they have merely done what sad experience has taught them to be essential—located themselves where the roots of their crops can reach a perennial water supply during the protracted dry season.

The irrigation system of Sistan is crude but, on the whole, effective. Every fall, when the Helmund River is at its lowest, the Persian Governor who controls most of the region calls out a large part of the male population. Tamarisks, cut in the jungle and bound into great bundles with their own branches, are brought on the backs of men or donkeys and piled into the diminished river at the head of the delta. Bundle is tied to bundle, and the whole is plastered with clay, forming a porous but fairly effectual dam. All through the planting season of winter and the vegetative season of early spring it diverts the water into a labyrinth of sluggish canals, which make travel a torture in the flat plain. Then, in May, comes the great flood from Hindu Kush and the flimsy dam is swept away. But the people do not care. The crops are almost grown, the remnants of the dam divert enough water into the canals for drinking purposes, and, when the time comes, the Governor will compel somebody—not them if they can help it—to build a new dam.

The flatness of the inhabited portion of Sistan causes the water to spread over very wide areas whenever the fields are irrigated. This, added to the depth of the canals and the slipperiness of the clayey soil, makes travelling well-nigh impossible in winter—a state of affairs which might be avoided if the aridity of the country did not compel the location of villages in the flattest, dampest places. The people are so accustomed to mud and water that even in freezing weather they wade unconcernedly through canals and rivers or through the water standing on roads and fields, and suffer fearfully from rheumatic complaints in consequence. Where a canal is too deep to be easily forded primitive bridges are constructed. As wood is very scarce, dry, bushy camel-thorn is thrown into the sluggish water and packed down until a firm but very porous dam is formed. A foot or two of clay is spread upon the camel-thorn

and a dry road is constructed. Such a bridge is easy to cross and does not greatly check the slow flow of the water. Often the flimsy structures are so strong that even horses and camels can cross them, although if the path is very narrow difficulties ensue. One of my camels slipped off the path and fell with his front feet hanging over a bridge upstream and his hind feet downstream. We were obliged to dig away not merely the bridge but part of the bank of the canal—a performance which the people seemed to regard as quite commonplace. In one case I saw a very broad bridge, which not only furnished an excellent pathway but carried one canal directly across another.

In addition to the muddy roads and flimsy bridges the aridity of Sistan produces other strange results. For instance, during the floods of the spring of 1904, a number of people were drowned because the water had been so low the previous winter. At that time the Helmund actually became dry. Fortunately, water could be obtained easily by digging wells, and no one suffered from thirst. The easiest places to dig wells were in the deep beds of the streams, for there the water was only a few feet below the surface. The most accessible parts of the stream-beds were at the fords, directly in the course of the everyday paths. So there the careless Sistanis dug their wells; and, when the water was high the next spring, walked into them and were drowned.

The lake and swamp of Sistan support more abundant life than do the plains. The vegetation is chiefly reeds and the low grass on which the Baluchi nomads feed their cattle. Among animals shell-fish and fish were formerly abundant, but are now scarce, having perished in great numbers during the almost complete drying up of the lake in 1871 and again in 1903. Insects and small animals of various sorts are abundant, as is evident when the swamp-men burn off the reeds for the sake of their cattle. The first fires that we saw appeared as immense columns of black smoke thirty miles away. Later, close at hand, we saw the fluffy heads of the reeds blazing up suddenly with a red flash and a sharp crackle almost like an explosion. The air in front of the flames was full of ravens, kites, crows, hawks, and other birds, which pounced now and again on the hapless little beasts and insects driven from their homes by the advancing heat. Behind the fire, where the ground had become cool, other birds were picking up the insects killed by the flames. The birds of Sistan are innumerable. During January we saw the water dark with thousands of them—coots, ducks, geese, pelicans, plovers, sand-pipers, grebes, swans, and others.

Early in February they were beginning to leave, presumably on their way to the lakes of northern Europe or Siberia.

The strangest dwellers in the swamp are the people, the ancient race of Sayads, or Fowlers. They are of the purest Persian stock, and appear to have preserved the same mode of life unchanged for ages. Their houses are made of reed-matting, their cowsheds of bundles of reeds, their heavy canoe-shaped rafts of more tightly-tied bundles of reeds, their fuel is reeds, and the food for their small, humped cattle is reeds. In fact, their whole life has adapted itself to an environment of reeds and swamp. When the Government sends for taxes they are said to know how to lose themselves and their cattle in the swamp as if by magic. If a stranger builds a raft upon the lake they attempt to destroy it by night, for they claim the water and all that pertains to it as theirs. Most of all, the birds are theirs. Each winter evening, in the sunset glow, a fleet sets forth from every village; men in blue or brown, with sturdy, naked limbs, stand on their golden rafts and pole them out over the gray-blue water to the fringe of yellow reeds. Nets are stretched on sticks half overhanging the water, and the men hide themselves in the rushes. A duck, a coot, or a swan, swimming under a net, strikes it unwittingly; the Fowler pulls a string, the net falls, and the bird is entangled. The Sayads own fields of grain in many places, but their chief source of livelihood is swamp-fed cattle and swamp-caught birds.

Three types of men live in Sistan—the nomad Baluchis, the agricultural Sistanis, and the swamp-haunting Sayads. The Baluchi is a nomad because his mountains and deserts cannot support him permanently in one place. Therefore he wanders with his flocks, and makes his tent of easily-obtained portable cloth of goats' hair. Being compelled by drought to come to Sistan, he is in part losing the nomadic habit and settling in villages. The Sistani is a settled tiller of the soil, because in no other way can a large population exist in Sistan. He uses the dry camel-thorn for fuel because it is nearer at hand than the tamarisk of the jungle, and he needs no fire except to cook his bread. He builds his house of mud, with a domed roof without a particle of wood, because good, stiff clay for sun-dried bricks is abundant, while wood large enough to serve as timber is almost unknown. Yet his brother of the same race, who lives in the jungle, builds his house of interwoven tamarisk boughs wattled with mud. The jungle man is also agricultural, but he moves from place to place every few years. It is easy to build a new house of his flimsy variety, and it is as hard in one place as

in another to keep the tamarisks out of his fields. The Sayad once more is a nomad, because his humped cattle must be driven to new reed-beds; but he need not move far, for fodder is easily procurable in large quantities. Young reeds grow fast when the ground has been burned over, and old reeds are so large that cattle eat them slowly. Nor does he need to carry his house and stable with him, for if there are plenty of reeds a day's work will make a new house. Moreover, he cannot migrate far, for he must be near his fields on the outer edge of the swamp, and he must be where he can always go for waterfowl on the inner edge.

The wind, like the other physiographic features of Sistan, has a marked influence upon life. During three months of the summer a remarkably constant wind blows night and day with great violence from the north-northwest. It seems to be the northward continuation of the trade-winds deflected to the west by the prevailing trend of the mountains. It is said to blow at a rate of over sixty miles an hour for days at a time without intermission. Its violence is such that the air is thick with flying sand; and huge sand-dunes are formed or blown away with almost the rapidity of snowdrifts. At Chil Pir, near the great ruins of Zahidan, I saw a sacred shrine located on the borders of the dune area, but entirely free from sand. A few months earlier, when the place was visited by Colonel MacMahon, of the Sistan Arbitration Commission, it was completely covered with sand, which—so the natives say—was blown away in three days after the summer wind began to blow. No trees, except the tamarisk, can flourish in Sistan unless carefully protected from the wind. On the northwest border of the region, however, where the gorge of Bendun affords a shelter from the wind, fine palm-groves are the main support of the villagers. Even low-growing plants are influenced by the monotonously fierce gales. The vine of the wild watermelon, a bitterly acrid little fruit, most delicately striped with green and yellow, does not spread in all directions, according to its normal habit, but is blown into a tangled, closely-packed rope of stems extending south-southeast from the root and so uniformly oriented that it might serve as a compass.

In spite of its disadvantages, the wind is of use to the people of Sistan. It grinds their grain and makes life livable in summer. In the houses of the rich extra doorways are built in the north wall. In winter they are walled up with sun-dried bricks of mud; in summer they are opened and stuffed with brush. A servant standing outside throws water upon this. The wind whistling through is cooled by evaporation, so that, although the outside temperature

may be over a hundred degrees, the interior sometimes becomes too cool for comfort—until the servant falls asleep and the burning blast sweeps in uncooled. When the wind dies down for a day or two the extreme heat is as nothing compared to the plague of the countless mosquitoes bred in the swamp.

Sistan deserves to be called a hell. A fly, like the tsetse of Africa, kills the horses; the dogs die of a peculiar epidemic which leaves the survivors blind; the camels are subject to two virulent contagious diseases. During January, 1903, the transport camels of the British Arbitration Commission were dying of influenza at the rate of from twenty to fifty a day. As we approached the camel camp groups of villagers appeared—one with camel-leg slung on his donkey, another with a rib over his shoulder, and a third with a liver on his back. At the camp scores of men were waiting for the suffering camels to die, when they hauled them out of the compound with ropes and chopped them to pieces with axes. The poor Sistanis get so little except bread and melons to eat that any flesh is a boon. They ate every part of the diseased camels except the bones and skin.

Yet Sistan is rich in possibilities. Even under the present oppressive conditions of government it exports large quantities of grain. It is a prize for which four nations are struggling. England and Russia desire influence; Persia and Afghanistan desire actual possession. In both cases the struggle is a geographic response to the peculiar character of Sistan as a fertile depression in the midst of a desert. Russia wants her influence to be supreme, because Sistan is the only promising half-way house on the most feasible line of railway from Transcaspia to the Indian Ocean. England, in the same way, wishes to be paramount, because Sistan is the only half-way house from India to western Persia. On every side stretch deserts, a month's caravan journey in width. In the middle Sistan furnishes a resting-place, with abundant water and supplies. The power that holds it has a priceless military advantage over its rival.

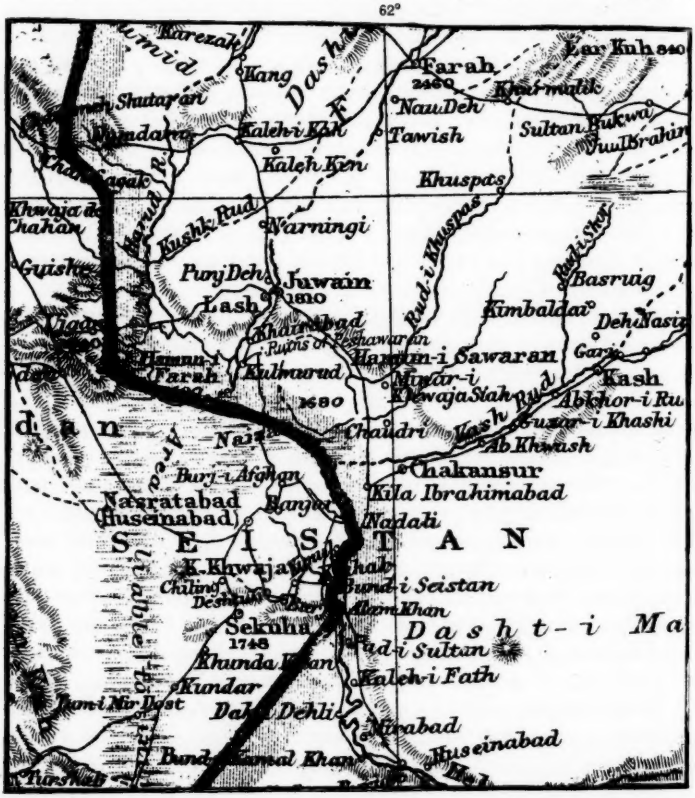
To-day Sistan is divided between Persia and Afghanistan in defiance of physiographic facts, and hence there is a continued and often sanguinary struggle. The water supply comes wholly from the Afghan mountains, and the easiest line of approach is across Afghanistan down the main rivers. The strip of desert west of Sistan offers a natural boundary between Afghanistan and Persia. In a few places it is narrow and easily crossed; elsewhere it forms an almost ideal international barrier. An Afghan caravan which had

crossed the desert north of Sistan in search of salt related that four or five men had died of hunger.

"Had the rest of you no bread?" we asked.

"Yes, but we feared that if we gave it to our friends we ourselves might suffer. That is the rule of the desert; each man for himself."

A desert whose horrors engender such heartlessness would seem to be an effectual barrier between nations. While the boundary between Persia and Afghanistan defies geography and passes through Sistan the two nations cannot be expected to live at peace.




Thus far we have considered a few of the many ways in which the physiography of Sistan influences the life of to-day. A complete study of the geography of the region must include also the influence of physiography upon life in the past. Tradition, historical record, and the distribution of ruins unite with the freshness of the aban-

doned lake bluffs in suggesting that within historical times the water supply of Sistan was greater than now. One or two thousand, or even five hundred years ago, this region, which is now so poverty-stricken, was most prosperous. According to Lord Curzon, the number of ruins in Sistan is probably greater than in any equal area in any part of the world. The former population must have been far more dense, and at the same time more prosperous than that of to-day. It seems probable that the decrease in the water supply, on the one hand, and the impoverishment and diminution of the people on the other, bear the geographic relation of cause and effect.

---

## THE TERRESTRIAL MAGNETIC WORK OF THE UNITED STATES COAST AND GEODETIC SURVEY.

BY

G. W. LITTLEHALES.

A retrospective glance at the beginnings and the growth of knowledge in terrestrial magnetism will heighten our appreciation of the important advancements that are being made in this branch of geophysics by the United States Coast and Geodetic Survey. Since, as a system of organized knowledge, terrestrial magnetism presupposes and requires centuries of observations, it has not long been entered in the hierarchy of the physical sciences, but has nevertheless made gratifying progress under the exceptional administration that has been bestowed upon the subject in the magnetic survey of the United States.

In comparison with the age of many of the other earth-sciences, it is singular to find that, even if it be admitted that a knowledge of the misdirection of the magnetic needle from the true north and south direction existed more than four centuries ago, it was reserved to Christopher Columbus to discover, during his voyage of discovery to the New World, that the declination was not everywhere the same, but that in one part of the Atlantic Ocean the compass needle pointed to the east of north, and in another part to the west of north; and that it was no longer ago than the year 1634 when Gellibrand, a Professor of Mathematics at Gresham College, in England, found that the declination at any certain place does not remain the same, but suffers a perpetual fluctuation with the course of time. The world waited for a realization that the magnetic needle, when freely

suspended, inclines or dips below the horizon, until Norman, a practical seaman and instrument-maker, made his experiments in the year 1576, and, besides discovering the magnetic inclination, published the surmise that the magnetic directing-force has its seat within the earth, and not in the heavens, as had been previously supposed. Gauss, of Göttingen, established the substantial truth of this surmise by analytical methods with the aid of accumulated observations of the values of the terrestrial magnetic elements, and in 1838 announced that the earth's permanent magnetism is derived almost entirely from sources within its own crust. This eminent mathematician and astronomer was among the first of those profound and subtle thinkers in terrestrial magnetism to go beyond the Empiricist School, in which the ruling idea was the treatment by arrangement of great masses of observations, and to pass on into the field now characterized by the writings of Dr. Bauer as published in his International Journal of Terrestrial Magnetism and Atmospheric Electricity, in which the work of the mind becomes a preponderating element in the constitution of the knowledge of the causes and manifestations of the earth's magnetic state.

About the year 1840 the discussion of observations of the direction of the magnetic needle and of the intensity of the earth's magnetic force became a feature of the work of the United States Coast Survey. The late Professor Schott had charge of these investigations for nearly half a century, and under his guidance a study was made of the diurnal variation of the declination in its various phases for different localities in North America. The secular change of the directional elements of the magnetic needle also received his attention, and he made a comprehensive and systematic collection of the magnetic observations taken in the United States and adjacent countries to serve the Survey as a basis for the solution of problems relating to the secular change of the earth's magnetism. Acting under the enlightened advice of Dr. Henry Pritchett, Congress increased the appropriation of money largely above what had previously been made for magnetic work in the Coast and Geodetic Survey, and so, in 1899, made it practicable to organize a Division of Terrestrial Magnetism and to secure the able leadership of Dr. Bauer in the conduct of the magnetic survey of the United States. This organization has established magnetic observatories in the eastern and western parts of the United States, in Alaska, in Hawaii, and in Porto Rico; has collected together a large material equipment; and is now carrying on its work under highly improved and efficient methods. At the end of the first five

XUM

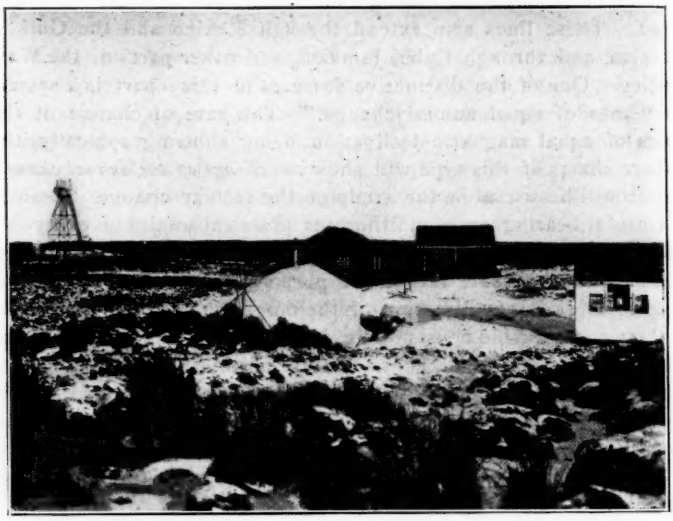
years of its existence, its operations in the United States and the countries under the jurisdiction of the United States have resulted in the survey of an area equal to one-third of that of Europe, and in making of observations for magnetic declination, inclination, and intensity at 1,636 stations, including a large number which had been previously occupied for magnetic observations and which were reoccupied with the object of providing data for the investigation of the secular change.

The results obtained by the Survey, supplemented by the results of surveys made by some of the State Governments, together with other information, enabled the U. S. Coast and Geodetic Survey to construct a chart depicting the lines of equal magnetic declination and of equal annual change in the United States for the epoch 1902. These lines also extend through Mexico and the Gulf of Mexico, and through Cuba, Jamaica, and other parts of the West Indies. One of the distinctive features of this chart is a system of "lines of equal annual change." The rate of change of the lines of equal magnetic declination being shown graphically, the future charts of this type will show *the change of the annual change*, which will be useful in the study of the secular change. Besides its useful bearing upon multifarious practical affairs of every-day life, and its value to students of geology and other branches of geophysics, the chart serves the purpose of navigators in ascertaining the correct direction of the magnetic meridian along the Atlantic and Pacific coasts of the United States and in the Gulf of Mexico and the Great Lakes. Future editions of this publication will be enhanced in value by the multiplying observations that will become available as the magnetic survey proceeds, and also by the recent commendable inauguration of a system of terrestrial magnetic observations at sea by the vessels of the Coast and Geodetic Survey.

When the extent of the magnetic observations of the Coast and Geodetic Survey is considered in connection with the intended magnetic survey of the North Pacific, which has been provided for under the direction of Dr. Bauer by the Carnegie Institution of Washington, it will appear that the terrestrial magnetic surveying work of the United States is already assured to embrace nearly one-fourth of the earth's surface, and that it may, with the possible extension by the Carnegie Institution of the surveying work to the other great oceans, ultimately cover more than three-fourths of the earth's surface.

## AN ARGENTINE OBSERVATORY AND SOME PATAGONIAN LAKES.

Captain H. L. Crosthwait, R.E., has a paper (*Geographical Journal*, March, 1905) on his journey to Lake San Martin, Patagonia, in connection with the demarcation of the Chile-Argentina boundary. Before landing in Patagonia his party made a short trip through the channels of Tierra del Fuego, and the first place touched at was New Year Island, situated in Lat. 54° 59′ S. at the south end of South America, about five miles off the north coast of Staten Island. The object was to visit the Magnetic and Meteorological Observatory established there by the Argentine Government



MAGNETIC AND METEOROLOGICAL OBSERVATORY, NEW YEAR ISLAND.

as a base observatory, in connection with the Antarctic expedition then in progress under Dr. Nordenskiöld.

We reproduce here from the *Geographical Journal* a view of this observatory. Captain Crosthwait speaks of it as complete in every respect:

> It is superintended by four Argentine naval officers, who, in the interests of science, exile themselves to this lonely and desolate spot. The attention they give to their work is well illustrated by the fact that they never allow the annual range of temperature in the magnetic observatory to exceed 1° C. The following temperature conditions have been recorded on this island, as given me by the officer in charge, since the observatory was opened in February, 1902. Highest record, 55° Fahr.; lowest, 16° Fahr.; annual mean, 41° Fahr. The magnetic observatory is kept at an almost constant temperature of 64° Fahr.

Staten Island was just visible through mist, and the writer says that an intense gloom beyond all description seems to overhang this place, which makes it look like the confines of the world. He speaks of Cape Horn as a "famous but very ordinary promontory."

A very striking feature of Beagle Channel in Tierra del Fuego is the astonishing number and variety of glaciers which occupy all the valleys descending from every mountain high enough to be covered with a mantle of perpetual snow. The valleys are sheltered from the summer sun, which accounts, in part, for the great extension of the glaciers. The coolness of the summer, rather than the severity of the winter, is also an important factor in maintaining both the glaciers and the comparatively low snow-line, which cannot be much more than 2,000 feet above sea-level. These are the main factors in the explanation of this glacier region. Most of the large glaciers, however, show signs of shrinkage.

Entering Patagonia, the party started for Lake San Martin, one of the lakes in the Cordilleras that, with their environment, were little known previous to the boundary surveys. On the way to San Martin the party visited lakes Argentino and Viedma, south of it. Viedma sends its waters to Argentino, which has an outlet to the Atlantic through the Santa Cruz River. Lake Argentino is a splendid sheet of water, 60 miles long and 10 to 20 broad, its western end having several long, narrow arms penetrating deep into the recesses of the Cordilleras, where they receive the waters of numerous glaciers. Large icebergs were found floating on the lake. All these lakes are fed by glaciers.

The physical geography of Lake San Martin region is especially significant. This lake, unlike Viedma and Argentino, has an exit into the Pacific. At the east end of the valley there is a shallow lake called Laguna Tar:

> At present its waters flow into Lake San Martin, *i. e.*, in a westerly direction. The continental water-divide is here so ill defined that a cutting of a few feet would cause Laguna Tar to flow to the Atlantic. There is the dry bed of a stream visible, and in time of flood this lake may, temporarily, have an exit in both directions. The continental water-divide would then run through a lake. A water-divide, therefore, without precise knowledge, may prove a very inexact definition for a boundary.

Captain Crosthwait says that San Martin undoubtedly occupies what was once a strait joining the Atlantic and the Pacific. The main body of water runs almost east and west, penetrating into the heart of the Cordillera. The mountains rise abruptly from its shores. It is subject to the most violent storms, which make the lake very rough and dangerous to navigate. The rocks around San Martin are mostly basalt. In many instances the basalt is cellular,

indicating that it had flowed under water. The geological sequence of events here seems to have been somewhat as follows:

A submerged land, when the sites of the great lakes were arms of the sea, such as we now find in Tierra del Fuego; volcanic activity, when lava flowed under water, as shown by the existing cellular basalt; elevation of the land, for we find numerous instances of upraised beaches with cellular basalt overlying them; following this, another period of volcanic action, and then an age of ice, for there is very marked evidence of ice-action on the basalt. In the present glaciers we have the lineal descendants of a glacial period.

The writer says that Patagonia is a fine field for the traveller who wishes to explore unknown glaciers and study glacial action. The climate, in summer, though cool, is very healthful.

---

## GEOGRAPHICAL RECORD.

### AMERICAN GEOGRAPHICAL SOCIETY.

TRANSACTIONS OF THE SOCIETY, APRIL, 1905.—A Regular Meeting of the Society was held at Mendelssohn Hall, No. 119 West Fortieth Street, on Tuesday, April 18, 1905, at 8.30 o'clock P.M.

Vice-President Moore in the chair.

The following persons, recommended by the Council, were elected Fellows:

| | |
|---|---|
| Benjamin J. Macdonald. | Samuel N. Hoyt. |
| Percival Lowell. | Luis Enrique Bonilla. |
| Frederick W. Frankland. | W. A. Peck. |
| Charles E. Morrison. | William W. Pennell. |
| William D. Mount. | Arthur Blair Moody. |
| Amos Lawrence Mason. | Charles Franklin Rand. |
| Henry C. Swords. | C. W. Parks. |
| Charles H. Reckefus, Jr. | |

The Chairman then introduced Professor E. L. Stevenson, who addressed the Society on The World as seen through the Eyes of Mediæval Map-makers. Stereopticon views were shown.

On motion, the Society adjourned.

### AMERICA.

THE GEOGRAPHICAL SOCIETY OF PHILADELPHIA.—The growth of membership of this Society during the past two years has been very gratifying. After May 1 an initiation fee of $5 will be charged in addition to the annual fee of $5. The Society and its library are now commodiously housed at 1520 Chestnut Street, and the library is constantly growing. Professor Heilprin gave a course of six lectures on current geographic topics in April. The Society has two regular meetings each month from November to May inclusive, besides special courses of lectures; its autumn and spring excursions are attractive features.

EVAPORATION IN THE UNITED STATES.—The problem of accurate and comparable observations of evaporation has always been one of the most unsatisfactory subdivisions of meteorology. Evaporation depends upon so many different factors, and the difficulty of agreement upon some standard evaporimeter is so great that, so far, absolute values of the amount of water evaporated have not been obtainable.

Even when a free-water service under sunshine is taken as the basis of measurement, the results remain unsatisfactory, for the reason that the amount of evaporation depends upon the depth, extent, and temperature of the body of water, as well as upon many other local conditions. In the *Monthly Weather Review* for December, 1904, there appears a paper on *Evaporation Observations in the United States*, by H. H. Kimball, of the U. S. Weather Bureau, which was read before the National Irrigation Congress at El Paso, in November last. The usual method of determining evaporation by deducting the run-off from the rainfall over a watershed, and attributing the difference to evaporation, is unsatisfactory, for, as a practical problem in irrigation, evaporation from water surfaces is of more importance than that from land surfaces. In *Water Supply and Irrigation Papers, No. 80*, of the U. S. Geological Survey, Mr. George W. Rafter computed the evaporation for twelve drainage basins in the Eastern United States by this method; but the engineer must consider the question of losses in the case of storage basins of considerable area, and if these are situated in a dry region, the loss may amount to 30 to 50 per cent. of the amount of water stored.

Between the years 1876 and 1886, Mr. Desmond Fitzgerald carried out a very exhaustive series of evaporation experiments in connection with the reservoirs of the Boston, Mass., waterworks, and the results were set forth in the *Transactions of the American Society of Civil Engineers*, Vol. 15, September, 1886, pp. 581–646. These investigations related not only to actual measurements of evaporation by means of tanks floating on the surfaces of the reservoirs, but also to the relation between the rate of evaporation and the temperature of the water surface, the air temperature, the humidity, and the wind movement. The rate of evaporation was found to depend upon (1) the vapour pressure corresponding to the temperature of the water surface; (2) the vapour pressure corresponding to the dew-point of the atmosphere, and (3) the wind velocity. Professor L. G. Carpenter, at Fort Collins, Colorado, has, since 1887, carried on a series of evaporation measurements in the case of water in a tank three feet cube, the top being flush with the surface of the ground (Ann. Repts. Agric. Exp. Sta., Fort Collins, Colo.). The formula obtained agrees remarkably closely with that of Fitzgerald. There is a difference in the value of the co-efficient of the wind velocity (W.), which is attributed by Professor Carpenter to the fact that the velocity at Boston was measured at the water surface, and at Fort Collins it was obtained from an anemometer on the roof of a building.

In 1887–1888, Professor Russell, of the U. S. Signal Service (*Monthly Weather Review*, 1888, p. 235), investigated the rate of evaporation in standard thermometer shelters by means of Piche evaporimeters, in which evaporation takes place from the moist surface of a porous paper. A formula was obtained, and the monthly evaporation at 140 Signal Service stations was computed from July, 1887, to June, 1888, inclusive, on the basis of the monthly mean wet-bulb and dew-point temperatures derived from the tri-daily observations. A chart was then drawn, showing lines of equal annual depth of evaporation in inches from a free-water surface. Professor Russell's formula does not include the wind velocity term of the Fitzgerald and Carpenter formulas, the equation representing the evaporation with a wind velocity outside the shelter of 7.1 miles per hour, which was the mean velocity at the stations where the Piche observations were made in June, 1887.

The author of the paper in the *Monthly Weather Review* for December, 1904, above referred to, holds that this wind velocity does not apply to all parts of the United States for all seasons, and that for this, and other reasons, Professor Russell's formula does not rest upon as sound a physical basis as do the formulas of Fitzgerald and Carpenter. For the purpose of checking Professor Russell's computed

values, the following comparison is made by Mr. Kimball, the measurements of evaporation given in the second series having been made at stations near those given in Professor Russell's series. While the results are not strictly comparable, since the stations are not in all cases identical, and in some cases the reservoirs are at a greater altitude than the Weather Bureau stations, they are noteworthy. The results computed by formula are generally higher. Mr. Kimball points out that Russell's equation, deduced from tri-daily observations, is not applicable to the present 8 A. M. and 8 P. M. observations unless a correction is applied, and believes that the formulas of Fitzgerald and Carpenter have a general application if the temperature of the water surface, the dew-point, and the wind velocity are known.

ANNUAL EVAPORATION.

| Russell's Formula. | | Surface Measurements. | | |
|---|---|---|---|---|
| Stations. | Evaporation. | Stations. | Evaporation. | Exposure. |
| | (inches.) | | (inches.) | |
| Boston, Mass. | 34.4 | Boston, Mass. | 34.78 | Beacon Hill Reservoir. |
| | | " " | 39.11 | Chestnut Hill Reservoir, floating pan. |
| New York, N. Y. | 40.6 | New York, N. Y. | 39.64 | Croton Reservoir, floating pan. |
| Cheyenne, Wyo. | 76.5 | Laramie, Wyo. | 46.30 | Ground. |
| | | Fort Collins, Col. | 46.16 | " |
| | | " " " | 59.50 | Computed for Reservoir. |
| El Paso, Tex. | 82.0 | Fort Bliss, Tex. | 82.65 | Floating pan. |
| Salt Lake City, Utah. | 74.4 | Fort Douglas, Utah. | 42.46 | " " |
| Fort Grant, Ariz. | 101.2 | Tucson, Ariz. | 75.78 | " " |
| Prescott, Ariz. | 56.0 | Tempe, Ariz. | 65.00 | " " |
| Sacramento, Cal. | 54.3 | Clear Lake, Cal. | 32.38 | " " |
| | | " " " | 33.40 | Ground. |
| Fresno, Cal. | 65.8 | Kingsbury Bridge, Cal. | 47.79 | Floating pan. |
| | | " " " | 59.49 | Ground. |
| Los Angeles, Cal. | 37.2 | Arrowhead Reservoir. | 36.60 | " (Elev. 5,160 ft.) |
| San Diego, Cal. | 37.5 | Sweetwater " | 57.55 | Floating pan. |

R. DEC. W.

THE FREE ZONE OF MEXICO.—Many who do not know why a "Free Zone" was established in Mexico may be interested in the following explanation condensed from *Commercial Mexico in 1905*, issued by our Bureau of Statistics: The Free Zone is a strip 20 kilometers (12½ miles) wide, extending along the northern border of Mexico from the Gulf to the Pacific. It is not quite free, because goods entering it from the United States have to pay 11½ per cent. of the Mexican tariff. If the goods are transported across the Free Zone to other parts of Mexico they have to pay the full tariff charge.

When the Rio Grande became the boundary between the United States and Mexico, in 1848, the conditions on the two banks of the river differed widely from one another. In the United States there were no taxes on internal commerce, and the tariff charges were low. In Mexico the tariff was very high, and each State imposed duties on goods entering from other States. The result was that goods in the border Mexican towns cost two to four times as much as in the Texas towns across the river.

This caused immigration into the United States to such an extent that the neighbouring part of Mexico was likely to be turned into a desert. The final result was that the Mexican Government established the Free Zone along the entire border, so that the Mexicans living there might be placed on about the same footing, as to the prices of commodities, as their neighbours over the line. Conditions have since altered so much that the Free Zone is no longer regarded as a necessity, and some day it may be abolished.

AGRICULTURE IN THE WEST INDIES.—Sir Daniel Morris, in his presidential address before the Fifth Congress of West Indian Agriculturists, held at Port-of-Spain, Trinidad, in January, gave interesting information concerning the changes now in progress in the economic conditions of the islands. On the whole, sugar is still the backbone of the industries, though in some islands it is now of little importance. Trinidad has turned from sugar to cacao, and is now exporting this product to the value of about $5,000,000 a year. The cacao crop is growing elsewhere, and the annual exports from Grenada are valued at about $1,000,000, and from Jamaica at $400,000. The cultivation of cotton is increasing, and Liverpool is paying good prices for the fibre. The export of fruit in many of the islands is now greater than the sales of sugar, and the trade in tobacco, rubber, Sisal hemp, and fish is growing. On the whole, the islands are recovering from the misfortunes due to the great fall in the price of sugar.

METEOROLOGY OF THE GREAT LAKES, 1904. THE METEOROLOGICAL CHART OF THE GREAT LAKES, No. 2, 1904, presents a summary of the meteorological conditions of the lake region during the season of navigation of 1904. The severity of the winter, and the unusually heavy accumulation of ice, prevented inter-lake navigation from becoming general until after the stormy period of spring had passed. The winter snowfall was heavy, and the greater part of the snow, especially in the northern districts, was preserved and was fed slowly into the lakes during the late spring and summer months; the stage of water on all the lakes, during the navigation season, being higher than any experienced for a number of years, except in the case of Lake Superior. The number of vessels totally lost through stress of weather was twenty. The loss due to fog was $218,000; and the total loss due to weather conditions was $467,425 less than during the previous season. Thirty-two lives were lost through stormy weather, this being a reduction of seventeen below the figures for 1903.

R. DEC. W.

RAINFALL ON THE COAST OF CHILE IN 1903.—A comparison between the rainfall during the year 1903 at Iquique and at Puerto Ancud, on the coast of Chile, brings out very clearly the difference between the desert region in the north, beyond the reach of the prevailing westerly winds, and the southern latitudes, where rain falls throughout the year. The contrast is similar to that found on the western coast of the North American continent, between Lower California and southern Alaska, or the coast of Washington. At Iquique (lat. 20° 12′ S.) 0.59 inch of rain fell, on one day, in July (midwinter). At Puerto Ancud (lat. 41° 41′ S.) the rainfall by months, and the distribution by days, was as follows :—

| MONTH. | AMOUNT (inches). | DAYS. |
|---|---|---|
| Jan. | 3.23 | 14 |
| Feb. | 3.66 | 12 |
| Mar. | 6.89 | 18 |
| Apr. | 10.08 | 17 |
| May | 8.42 | 21 |
| June. | 13.39 | 25 |
| July | 8.70 | 19 |
| Aug. | 10.63 | 23 |
| Sept. | 10.75 | 24 |
| Oct. | 3.66 | 13 |
| Nov. | 3.50 | 14 |
| Dec. | 6.93 | 13 |
| Year. | 89.84 | 213 |

R. DEC. W.

THE ARGENTINE ANTARCTIC METEOROLOGICAL STATION AT SCOTIA BAY, SOUTH ORKNEYS.—Reference has lately been made in these *Notes* to the meteorological station at Scotia Bay, South Orkneys, which was originally established by the Scottish Antarctic Expedition, and has now been taken over by the Argentine Government. The *Scottish Geographical Magazine* for April, 1905, contains an account of the first year's work at this important station under Argentine auspices. During 1904 the lowest temperature occurred on August 3 and 4, with a minimum of −40° F., and a mean on the latter day of −33° F. In 1903 the minimum was −26°. A phenomenally high temperature of 46.8° was recorded on May 31, 1903, during a *foehn* wind, and a similar occurrence on August 28, 1904, gave a temperature of 40.0°. A heavy thunderstorm occurred in August, and another in October, this being an unusual occurrence. In 1903 the most severe gales came from N. W. to S. W., but in 1904 at least three severe gales came from S. E. The weather in 1904 was very different from that in 1903, being more severe, but fine for longer periods at a time. The contrast was probably due to the difference in the position of the pack-ice.

R. DEC. W.

## AFRICA.

SALT IN AFRICA.—Between Senegal and the Central African lakes and between the Sahara and the Zambezi is an extensive region, too distant from the sea to supply itself with salt by evaporating sea-water; and as it has no salt deposits, the inhabitants rely, to an important extent, upon two plants—one a variety of the *arum* family, and the other a species of bamboo, which they dry and burn and then leach the ashes, using the residuum as we use salt, which it somewhat resembles in taste. The coast people of West Africa buy annually about 40,000 tons of salt that is shipped from Liverpool and is obtained chiefly from the salt district of Norwich, England. A few thousand tons of German salt are also sent to West Africa.

This European salt, however, is not available for trade more than about 130 miles inland, because the heat and humidity reduce it to a liquid state. It deteriorates in the storehouses on the coast, and even more during transportation. It is not European salt, therefore, that supplies the vast inland region from the Sahara to the Zambezi. Practically the sole source is the salt of the Sahara, which fills a part of the demand.

The product is put up in the form of bars of an average weight of 25 to 30 kilograms, each piece being about a metre in length, 30 centimeters wide, and from 5 to 8 centimeters thick. It is crude and dirty, and other substances mingled with it colour the salt red, black, or gray. But it has the great advantage over the imported articles that it is solid and withstands humidity. It is carried south from 1,000 to 1,200 miles without detriment.

The cost rapidly increases with the length of the journey. At Timbuktu it is sold at 1 franc a kilogram; at 2 francs on the Upper Niger; at 4 francs on the Congo; and more is paid south of that river. The commodity is inadequate in quantity, and every middleman has his profit. There are three regions of the Sahara which produce salt.

If European salt can be put up in such a way as to withstand the climate, there will be great profit in its exportation to inner Africa. The British have tried the experiment, but thus far have not succeeded in producing salt bars that are proof against tropical humidity. On the other hand, a French company, "La Société marseillaise du Sel aggloméré," is producing bar salt, in which, according to the *Revue des Deux Mondes*, the salt is compressed to half its original contents, is smooth

and glistening, and extremely hard. It is asserted that this salt bar withstands the climatic conditions. It is now being sent into the French colonies.

It is estimated that foreign salt which will retain its quality may be sold annually to the amount of 1,000,000 tons in inner Africa. The natives would welcome it as a great boon. (Condensed from Dr. C. Müller's "Die Salzversorgung Zentralafrikas," in the *Deutsche Rund. für Geog. und Stat.*, Vol. 27, No. 5.)

THE MARQUIS DE SEGONZAC IN CAPTIVITY.—In November last the Comité du Maroc of Paris sent the Marquis de Segonzac back to Morocco with Mr. Gentil, lecturer on geology at the Sorbonne, and Mr. R. de Flotte-Roquevaire (whose large map of Morocco is well known), as assistants, to engage in exploration in the southwestern part of Morocco. In April the news came that de Segonzac had been denounced by one of his guides as a Christian, and betrayed into the hands of the Seketana Berbers. The party arrived late last year at Mogador, the Atlantic seaport nearest to their field of work.

The tribes of the interior were in revolt against the Sultan, which greatly increased the danger of travel. It was decided to be unwise to work together, and so they divided the field. Gentil was assigned to study the geology of the City of Morocco and its environs and the Sus region; de Flotte-Roquevaire was to triangulate a district in the Great Atlas between Mogador and the City of Morocco, and de Segonzac was to explore a part of the southern slope of the Great Atlas and locate the hydrographic centres from which issue a number of the streams of that region.

Gentil and de Flotte-Roquevaire completed their work and returned to Mogador to await their leader. He wrote on Feb. 4 that he had explored the central part of the Great Atlas, had secured the material needed to map it, and had connected his new work with that which he had done in 1901. He intended to start for the coast in a few days. It is supposed that he is being held by his captors for a ransom.

This young and ardent explorer between 1899 and 1901 made a number of venturesome journeys, always in disguise; but in spite of the obstacles in his way he brought to France a harvest of scientific results in the form of route surveys, astronomical observations, ethnological notes and botanical and geological collections, which attracted much attention.

SENSIBLE TEMPERATURES ON THE CONGO.—In the BULLETIN for March, 1904 (Vol. XXXVI, pp. 129–138), reference was made to the various suggestions regarding the best method of expressing the temperatures which the human body feels under varying conditions of air temperature, moisture, wind velocity, exposure to direct insolation, and so on. It was there pointed out that the so-called "sensible temperature" is the complex resultant of many variables, and is so complex and so individual that no simple expression can be found for it. Nevertheless, various scales of sensible temperatures have been suggested, as, for example, those of Abbe, Osborne, Lancaster, and others; and we should doubtless gain much in our understanding of the physiological effects of various climates if we had, in addition to the ordinary records of meteorological elements, some tabulation of the feelings of comfort or discomfort experienced by the human body.

It is interesting to note, in this connection, that in a recent publication of the *Société Belge d'Astronomie* (*Bulletin*, No. 11, 1904, *La Chaleur au Congo*), prepared by J. Vincent, meteorologist at the Royal Observatory of Belgium, there is a tabulation and discussion of observed "sensible temperatures," recorded on the following

scale, originally proposed in the *Annuaire* of the Royal Observatory of Brussels for 1890:

Très chaud.....Sueur abondante, malaise.
Chaud.....Sueur; on est peu ou point incommodé par la chaleur.
Tiède.....Sensation de chaleur sans sueur.
Tempéré.....Etat indifférent. On s'assied en plein air sans pardessus.
Frais.....Sensation de froid non désagréable aux mains. On ne a'assied plus en plein air sans pardessus.
Froid.....Sensation de froid désagréable aux mains.
Tres froid.....Sensation de froid insupportable aux mains; désagréable au visage.

These observations were made at Kisantu, at the mission of the Jesuit Fathers, and began December 14, 1903. They form part of the third series of meteorological observations taken in the Congo region at the instance of and by means of instruments given by the *Société Belge d'Astronomie*. The second series, taken at Tchimbane by Mons. A. Balat, contained the first systematic record from the Congo country of "sensible temperatures" (published in the *Bulletin* of the Société, Vols. 7 and 8). Among 169 noon observations made at Kisantu there were the following numbers according to the above scale: 8 *frais;* 48 *tempéré;* 82 *tiède;* 29 *chaud;* 2 très *chaud*. These observations were made in the shade, as they should have been. M. Vincent points out, in his comments on these records, that the evidence which they bring regarding the climatological, or sensible, temperature, is not unfavourable to the Congo district, and criticizes some statements previously made by Lancaster regarding the discomfort experienced there by reason of the high temperature and relative humidity (*Le Climat du Congo*, Brussels, p. 19). In regard to these criticisms, it may here be noted that, as was above suggested, individuals vary so much, for obvious reasons, regarding their feeling of heat or cold, and comfort or discomfort, that a careful comparison of "sensible temperature" observations, even when these have been carefully made according to a fairly well-defined scale, is hardly worth while. Doubtless many of the accounts of Congo climatic discomforts may have been somewhat exaggerated. Doubtless, also, no one but Brother Molitor himself, the observer at Kisantu, would have had just the sensations of heat and cold above tabulated. R. DEC. W.

ANCIENT RUINS IN RHODESIA.—Mr. Richard N. Hall, who has given eight years to the study of the ancient monuments in southern Rhodesia, says (*Geog. Jour.*, April, 1905) that none of the hundreds of ruins has been more than partially explored. Many important ruins have been seen only by casual travellers, and the work of unearthing only a part of the Great Zimbabwe area would be more than the labour of a lifetime. Still, researches have made great progress in the past few years. There are in Rhodesia no less than 300 distinct ruins and groups of ruins. Only a few scores of these are entitled to rank as "ancient." The larger part of them probably does not date back of the thirteenth, fourteenth and fifteenth centuries.

There is overwhelming evidence at the Great Zimbabwe of the ancient civilization and arts possessed by the builders of the earliest period. The Zimbabwe temple is the finest and most intact example of a Nature-worshipping shrine known to the world. Its construction points unmistakably to some knowledge of geometry and astronomy on the part of the builders. It is quite certain that even the cruder methods at Zimbabwe of applying this knowledge, which was common to the

ancient Semitic peoples, were imported from the near East and did not originate in Southeast Africa. The right ascension of the sun, the heliacal rising and the meridian passages of stars, are believed to have been noted at Zimbabwe. These ancient builders were also past masters in the science of military defence, the walls showing that the builders were military strategists of the highest order. Their gold ornaments, finely designed and engraved, could not have been the work of an uncivilized people; and the hundreds of ancient gold mines show that they were skilled in metallurgy and picked out rich shoots, patches, and pockets with marvellous cleverness. It is estimated that from these widespread mines they extracted $375,000,000 of gold.

## ASIA.

ALBUM OF PHILIPPINE TYPES.—The volume with this title, published last year at Manila by the Philippine Government, contains 160 photographs of 80 men who were in Bilibid prison in 1903. This large penitentiary contains about 3,000 men. The persons whose photographs were taken were selected as fairly typical of the populations from which they came. Most of them are from the tribes officially denominated as Christian—the Tagalog, Visayan, Bicol, Cagayan, etc.; but the non-Christian tribes, including the Moro and the Negrito, are represented. Complete anthropological measurements are given for each of the subjects, and the introduction contains further particulars concerning the men photographed and estimates as to the value of each subject as typical of his tribe.

## OCEANIA.

EXPLORATION IN NEW GUINEA.—Mr. A. E. Pratt, who recently returned to England from a two-years' expedition in the remote interior of British New Guinea, chiefly along the Owen Stanley Range, has sailed on a new scientific expedition, which is expected to last for two and a half years. Mr. Pratt, accompanied by his two sons, proceeded direct to Batavia, where he will make final arrangements for his journey. After conferring with the Dutch Government officials he will cross to Dobo, the chief town of the Aru Islands, a group very little known to Europeans. After making collections there, the expedition will cross to Dutch New Guinea, and will immediately strike into the interior, with the object of reaching the highest possible point of the Charles Louis range, a snow region running east and west and never yet explored. Valuable geographical results are expected, and a map will be made, but the special work of the expedition will be the collecting of natural history specimens.

## POLAR.

THE FRENCH ANTARCTIC EXPEDITION.—Further details of the work of Dr. Charcot's expedition have been received. Dr. Charcot reported by telegraph (*La Géog.*, Feb., 1905) that the *Français* wintered at Wandel Island, at the southern extremity of Gerlache (formerly Belgica) Strait, in 65° S. Lat. The *Uruguay*, in its search for the party, went within twenty miles of these winter quarters. The party succeeded in settling the question of Bismarck Strait by sending an expedition through it, proving its connection with the more eastern Sea. The strait was discovered by the German Dallman, in 1874, at the western end, and it has since been a question whether it was really a strait, cutting off the northern part of the Graham Land Peninsula, or only a fiord penetrating some way into the land.

The party also laid down the shore-line of a part of the unexplored west coast of Graham Land for a considerable distance to the south, and landings were made at

several points. It also explored the Palmer Archipelago, the islands separated by Gerlache Strait from the mainland. Impenetrable ice-pack prevented the explorers from reaching Alexander I. Land, though they came within sight of it. The *Français* ran aground on the Graham Land coast, but the serious leak resulting was fortunately repaired. Considerable additions to our knowledge of this region appear to have been made by Dr. Charcot's thirteen months' sojourn in the Antarctic.

ANOTHER ARCTIC ENTERPRISE.—It is reported that the Duc d'Orléans has organized a north polar expedition with which he will leave Norway early in May, accompanied by Capt. Gerlache, who commanded the Belgian Antarctic expedition. The party will proceed to Franz Josef Land, where an attempt may be made to push northward by means of a new channel. The object is not to reach the North Pole, but to make a further study of the archipelago. The Duke does not anticipate wintering in the Arctic, though his ship will be provisioned for that possible event. Besides the Norwegian crew the party will include a number of French scientific men. As the season appears to be early this year, it is thought that there will not be much difficulty in reaching Franz Josef Land.

## COMMERCIAL GEOGRAPHY.

THE RAILROAD FROM ORENBURG TO TASHKENT.—In September last the Russians completed the railroad from Orenburg, a city on the eastern frontier of European Russia to Tashkent, the most important centre of commerce in Russian Central Asia. The line is 1,100 miles long. It is now the shortest and most direct route between Russia and Central Asia, and it will considerably diminish the importance of the Trans-Caspian railroad, as it will no longer be necessary to make the great detour to Caucasia and across the Caspian Sea in order to reach the heart of Central Asia. The road will also promote the development of civilization along the great valley of the Syr Daria. Large works for the accumulation and storage of water supplies are now in progress. Along some stretches of the road, water is in inadequate supply, and the deficiency is being remedied at great expense.

THE CAPE TO CAIRO RAILROAD.—According to the latest information, good progress is being made with the extension northward from the Victoria Falls of the Cape to Cairo railroad. It is expected that the railhead will be at Kalomo, the administrative centre of northwest Rhodesia (Barotseland) by June. The further extension of the line for 250 miles beyond Kalomo will be made by the Mashonaland Railroad Company, which is operating the line from Bulawayo northward. The terminus of the new extension at Broken Hill will be reached early next year. There will then be continuous railroad communication from Cape Town, a total distance of some 2,000 miles, to within 100 miles of the southeast corner of the Congo Free State. On the Victoria Falls—Kalomo section—50 miles of earthworks are finished and over 25 miles of rail laid.

THE MOST ELEVATED POINT ON THE RAILROAD AROUND THE CONGO CATARACTS.—The Congo Free State has chnnged the name of Sona Gongo, a station on the line from Matadi to Stanley Pool, to Thysville, in honour of Colonel Thys, under whose charge this railroad was built. The station is half way between Matadi and Stanley Pool, among the Crystal Mountains, at an elevation of 741 meters. It is one of the highest points in the Congo basin, 717 meters above Matadi, the starting-point, and 457 meters higher than Leopoldville, the terminus of the road. Trains on this road do not move in the dark, and all of them stop for the night at Thysville, making

the entire journey in the daylight of two days. The railroad company is now building a hospital for whites and another for blacks at this station, which seems to be a favourable location for the future sanatorium of the Congo State.—(*Le Mouve. Géog.*, No. 8, 1905).

TOBACCO IN SOUTHERN RHODESIA.—The Agricultural Department of Southern Rhodesia, where no white man dared to set his foot a quarter of a century ago, has become convinced that the country offers superior facilities for the cultivation of tobacco. In order to acquire helpful information, Mr. George M. Odlum, a member of the staff, was sent to this country last year to study the industry in all its phases. The result of his work, published by the British South Africa Company, now appears in a handsome volume of 200 pages, under the title "The Culture of Tobacco." It is devoted to our tobacco soils, our methods of planting and cultivation, and the curing and marketing of the crop. A finer manual of the kind would be hard to find. Scores of half-tone pictures adorn the book, including photographs of tobacco fields in Southern Rhodesia, showing the crop in all stages of growth, and proving, at least, that it thrives vigorously there. It is asserted that this region is an ideal tobacco country. This is the latest illustration of the energy and push that are transforming Southern Rhodesia. White farmers are tilling the soil, and reapers and steam-diggers are busy where a few years ago native women were the only agriculturists.

EXPANSION OF CROP AREAS.—No result of the study of ecology is more valuable than the discovery and use of new fields adapted to the growth of plants of economic value. A few illustrations of this branch of geographic research from recent Consular Reports will show the importance of the study:

BANANAS—COLOMBIA.—The cultivation of this tropical fruit is being extended along the Gulf of Uraba, and also near Santa Marta, where the conditions of soil, sunshine, and rainfall have been found to be specially adapted. Already the earlier plantings have come to fruition, and the quality of the product augurs well for the industry. Local markets are excellent, and American markets, also, should furnish a good outlet for export.

Experiments in banana culture, first for coffee shade and now for export fruit, have given promising results in Mexico. The plant desires moderate upland not too near the sea, much sunshine and rain, and a clay soil. These conditions have been found in a belt of varying width near the coast in the States of Vera Cruz and Tabasco. Where transportation permits plantations are being set with slips. A possible manufacture of various products from the banana in the more inaccessible regions also promises the extension of its cultivation.

RAMIE—SOUTHERN STATES.—It has been insisted that our Southern States are especially adapted to the growth of this fibre plant. In the face of the growing European demand for the raw material, further study and experiments might give us another southern crop. A further suggestion of this kind which is being contemplated is the introduction of rubber culture into the Philippines to supply our market. This is urged because the soil, climate, and labour conditions are as well adapted to its production in these islands as in Borneo, Java, Ceylon, Sumatra, and the Malay Peninsula, where there is much activity in rubber culture.

COFFEE—QUEENSLAND.—Recently many studies to extend coffee culture have been made. Suitable conditions, barring some one element, have been found in many places, but few successful experiments have been made. A native coffee in several

parts of tropical Africa promises well, but real introduction, based on knowledge of geographic conditions, is, perhaps, best illustrated in Queensland, Australia. A fair local market has developed in the continent. The moderate upland soils and the climate, in the northern part, especially favour this crop.

HENEQUEN—QUEENSLAND.—This fibre, so valuable for binding-twine, cord, rope, etc., has been sought to occupy a warm, semi-arid, stony, hilly region, now producing little of value. Its introduction from Yucatan, where it is rapidly enriching the people, is the result of a careful study of conditions in both countries, and the success of the venture seems assured. The market in the grain districts of Victoria is large, and the foreign market is not glutted. Owing to its keeping qualities, it can be grown in the interior, whence transportation to the ports is long and hard, and yet come to market in good order.

COTTON ABROAD.—In 1900, 75–80 per cent of the world's cotton crop of about 7,000,000,000 pounds came from the United States, but cotton is grown in many tropical and sub-tropical countries. The increasing demand for it, and the increasing desire of nations to grow their own raw products, have stimulated investigation in cotton culture to a great extent. It seems that in many parts of Africa the industry finds specially suitable conditions. Labour is usually to be had; soil, rainfall, drainage, and long seasons are provided. Transportation is the great drawback. In the German East African cotton-growing districts not only are railroads being built to move the crop, but an automobile service to bring the product from plantation to railroad is being installed.

Cotton-growing is being introduced into Colombia at two or three points, and is being rapidly extended, where conditions permit, in the departments of Magdalena and Bolivar. It is estimated that there are in Colombia about 3,000,000 acres adapted to Colombian long-stapled cotton, comparable with that of Sea-Island cotton.

In China much of the best cotton-producing land is more profitable for growing food than cotton, and most of the cotton produced is of an inferior quality. China as a market seems assured, because her use of cotton goods is growing rapidly.

G. D. H.

## GENERAL.

DR. KLOTZ'S ASTRONOMICAL STATIONS.—Dr. Otto Klotz, Government Astronomer of Canada, has arranged with the Harvard Observatory for a station to perfect his series of longitude observations, for which the completion of the British trans-Pacific cable offered a fine opportunity. Beginning at Ottawa, he and his party made longitude connections with Fanning Island, the Fiji Islands, Norfolk Island, Queensland and Sydney, N. S. W., where his series of connections met a like series eastward to Sydney. This was the first circuit of the world made in work of this character.

At each of the stations a pier of cement or brick is erected, the longitude of which is determined by time differences, shown by telegraph with the utmost possible accuracy. Such a pier is to be erected at Harvard, so that Dr. Klotz may connect the Canadian trans-continental longitude series with the American series; ultimately a similar connection will be established between Vancouver and Seattle.

METEOROLOGY AT THE UNIVERSITY OF WISCONSIN.—The University of Wisconsin will, next year, give instruction in meteorology under Mr. James L. Bartlett, observer at the University station of the U. S. Weather Bureau.

GEOGRAPHY IN OXFORD DURING 1904.—The attendance at the School of Geography in Oxford was, in the Hilary term, 117; Easter term, 141; Michaelmas term, 146. The attendance of women was from 7 to 23. The total attendance was nearly double that of 1902. Lectures were delivered by Dr. Mackinder on the historical geography of Europe and of the British Isles; by Dr. Dickson, on the climatic regions of the globe; by Dr. Herbertson, on systematic and regional geography; by Dr. Grundy, on the strategic geography of Greece; and by Mr. Beazley, on the history of geography. The attendance was at times too large for the lecture-rooms. The reference library is constantly growing, and the collection of maps of Central Europe on a scale of at least 1:200,000, and of the British Isles, on a scale of 1:126,720, will soon be completed as far as they exist. The Committee welcomes contributions to the collections of the School.

ROYAL GEOGRAPHICAL SOCIETY MEDALS FOR 1905.—The Founder's Medal has been awarded to Sir Martin Conway for his various mountain explorations and work among the glaciers and mountains of Spitsbergen; the Patron's Medal to Captain C. H. D. Ryder for important results while acting as chief survey officer on the recent Tibetan mission; the Victoria Research Medal to Mr. J. G. Bartholomew for great contributions to the progress of cartography; the Murchison Grant to Mr. William Wallace for geographical work in the Protectorate of Northern Nigeria; the Gill Memorial to Col. F. R. Maunsell for explorations in Asia Minor; the Cuthbert Peek Grant to Mr. F. J. Lewis for contributions to knowledge of botanical distribution by researches in the north of England; and the Back Grant to Capt. Philip Maud for survey work on the south border of Abyssinia.

TRAVELS OF FRENCH STUDENTS.—In three years (1898–1900), Mr. Albert Kahn gave 75,000 francs to pay the expenses of five young men in each year, or fifteen in all, on journeys to different parts of the world. He desired to give to students who had completed their university course, and intended to be teachers in the higher schools, an opportunity to supplement their theoretical training with practical knowledge of various countries and peoples. The only condition he imposed was that the travelling students should be conversant with the English language. They were free to select their routes of travel and to dispose of the allotted year as they pleased.

The confidence he reposed in these young men seems to be fully justified by the book "Autour du Monde par les Boursiers de Voyage de l'Université de Paris," which has just been published. Thirteen of the fifteen students contribute to the book, two having been unavoidably prevented. They sum up the results of their observations in Palestine, Burma, Java, French Indo-China, Japan, the Philippines, America, India, New Zealand, and other of the French and British colonies. They have benefited by the generous and novel idea of Mr. Kahn, and the results of their studies in many parts of the world will not fail to be useful in their educational work.

MINERAL PRODUCTION OF CANADA IN 1904.—The Canadian Government Trade Enquiry Branch has issued a preliminary summary of the mineral production of the Dominion for 1904, from which it appears that the value of the metallic production was $31,222,525, a falling off of about $2,250,000 from 1903. This decrease appears to be due, not to an unfavourable condition of the metal industries, but to the subsidence of the inflation, occasioned by the rapid exploitation of the more easily accessible Yukon placers. The gold yield was worth $16,400,000—a decline of about $2,400,000 from 1903. The value of the other metallic products was: Copper,

$5,510,119; iron ore exports, 401,738 tons; pig-iron from Canadian ore, $901,880; lead, $1,637,420; nickel, $4,219,153; silver, $2,127,859; zinc, $24,356.

Among the non-metallic products were, coal, $14,599,090; coke, $1,884,219; asbestos, $1,167,238; and petroleum, $984,310. The total value of the mineral products was $60,343,165.

DEATH OF PROFESSOR ADOLF BASTIAN.—Dr. Bastian, Director of the Berlin Museum für Völkerkunde, is dead in his eightieth year. In spite of his advanced age he was at the time of his death engaged on a scientific journey in Trinidad. Among the many scientific books of which he was the author "Die Völker des östlichen Asien" and "Die Kulturländer des alten Amerika" were especially conspicuous.

DER NATURWISSENSCHAFTLICHE VEREIN FÜR SCHLESWIG-HOLSTEIN, of Kiel, will celebrate its fiftieth anniversary by a festival on the 17th and 18th of June, 1905.

On the 17th, there will be an inspection of the Natural History collections of the University, and visits to the ships of war, and the dock yards, and a social reunion will be held in the evening at the Seebadeanstalt.

On the 18th of June, after a morning session in the University, and a luncheon, there will be an excursion on the Kiel Inlet.

Those who desire to attend the celebration are requested to send in their names by the 1st of June.

U. S. BOARD ON GEOGRAPHIC NAMES. DECISIONS, APRIL 5, AND MAY 3, 1905. CHINESE PROVINCES:

ANHUI; (Not Nganhwei, Ngan-hwei, Ngan-hoei, Ngan-hui, Ngan-hwuy, nor Ngan-Hwuy.)

CHEHKIANG; (Not Cheh-kiang, Chekiang, nor Che-kiang.)

* CHIHLI; (Not Pechili, Pe-chili, Pe-chi-li, Chih-li nor Chi-li.)

* FUHKIEN; (Not Fukien, Fu-kien, Fuh-kien, nor Foo-kien.)

HONAN; (Not Ho-nan.)

HSIN CHIANG; (Not Eastern Turkestan, nor Kashgaria.)

HUNAN; (Not Hu-nan nor Hoo-nan).

HUPEH; (Not Hu-peh nor Hoo-pe.)

KANSU; (Not Kan-su, Kansuh, nor Kan-soo.)

KIANGSI; (Not Kiang-si nor Kiang-se.)

KIANGSU; (Not Kiang-su.)

KUANGSI; (Not Kwangsi, Kwang-si, nor Quang-se.)

KUANGTUNG; (Not Kwangtung, Kwang-tung, Kwantung, Kang-tung, nor Quang-tung.

KUEICHOU; (Not Kui-chou, Kweichou, Kwei-chow, nor Quei-chow.)

* Revision of previous decisions.

SHANGTUNG; (Not Shantung nor Shan-tung.)

SHANSI; (Not Shan-si nor Shan-se.)

SHENSI; (Not Shen-si nor Shen-se.)

SSUCH'UAN; (Not Szechuen, Sze-chuen, nor Sze-chuan.)

YÜNNAN; (Not Yunnan, Yun nan, nor Yun-nan.)

* * * * *

MUKDEN; *city, China.* (*Not Mookden nor Moukden.*)

BANKA; island, lying between Sumatra and Borneo. (Not Banca nor Bangka.)

CAPTAINS; bay, Alaska. Between Iliuliuk bay and Nateekin bay.

* CARQUINEZ; bay, point, and strait, connecting Suisun and San Pablo bays, California. (Not Carquines, Karquines, nor Karquenas.)

* CHOUTEAU; county, Montana. (Not Choteau.)

* DONA ANA; county, P. O., R. R. station and precinct, New Mexico. (Not Donna Ana nor Doña Ana.)

GRASS; river, tributary to the St. Lawrence river, St. Lawrence County, New York. (Not De Grasse, Grasse, nor La Grasse.)

* Iliuliuk; harbour, Alaska. An arm of Unalaska bay, east of Dutch harbor. (Not Unalaska, Captains Harbor, not Levashef.)

LE CONTE; bay and glacier, east of Mitkof island, Frederick sound, southeastern Alaska. (Not Hutli, Hulti, nor Thunder.)

* LEWIS AND CLARK; county, Montana. (Not Lewis and Clarke.)

LITTLE SALMON; stream tributary to Lake Ontario near Texas, and about 4 miles west of Salmon river, Oswego County, New York. (Not Salmon.)

PORT LEVASHEF; port, Alaska, at head of Captains bay. (Not Captains harbor nor St. Paul.)

SYCAMORE; creek, tributary to Verde river from the N.E., Yavapai county, Arizona. (Not Dragoon nor Dragoon Fork.)

* Revision of previous decision.

CHEFOO; city, China. (Not Chifu, Chi-fu, Che-foo, Chee-foo, nor Tschi-fu.)

LIAOYANG; city, China. (Not Liau-yang, Liao-yang, nor Liaoyan.)

TIELING; city, China. (Not Thieling, Tie-ling, nor Telin.)

---

AMERICAN CORNERS; village, P.O., and district, Caroline county, Maryland. (Not American Corner.)

CHOGA; creek, Macon county, North Carolina. (Not Chogee.)

HINCHINBROOK; principal entrance to Prince William Sound, Southern Alaska. (Not Meiklejohn.)

HUGHES; P. O. and R. R. station, Butler county, Ohio. (Not Hughs.)

INDIAN; creek, Chowan county, North Carolina. (Not Dillard nor Dillard Mill.)

MARSHYHOPE; branch of the Nanticoke river, Dorchester and Caroline counties, Maryland; and Kent and Sussex counties, Delaware. (Not Marshy Hope, Marsh Hope, West Branch of Nanticoke river, West or N. W. Fork of Nanticoke, nor N. W. Prong of Nanticoke.)

NORRIS; glacier on the west side of Taku Inlet, southeastern Alaska. (Not Kadischle, Kadishle, nor Windom.)

SALT LAKE CITY; city, capital of Utah. (Not Salt Lake.)

SANTEETLAH; creek and P. O., Graham county, North Carolina. (Not Santeetla nor Santutlah.)

SHEWBIRD; P. O. and mountain, Clay county, North Carolina. (Not Shoo Bird nor Shoobird.)

SHOSHONE; established for all place-names, but not for tribal name or Reservation.

TAKU; glacier at the head of Taku Inlet, southeastern Alaska. (Not Klumû Gutta, Klumma Gutta, nor Foster.)

There is substantial agreement among authorities with regard to the names of the Chinese provinces, and it does not seem to be wise to prefer the unusual forms *Anhui* and *Hsinchiang* to *Ngan-whei* and *Sinkiang;* and the Board, in writing *Chefoo* for *Chifu*, disregards its own excellent principle of adopting the Italian vowel-sounds.—(EDITOR BULLETIN.)

# NEW MAPS.

## AMERICA.

CANADA.—Explorations in Northern Canada and adjacent portions of Greenland and Alaska. Latitudinal scale, about 74.3 statute miles to an inch. By James White, Department of the Interior, Ottawa, 1904.

All the Arctic coasts are tinted to indicate the expeditions that explored them. The tracks of explorers are also shown.

CANADA.—Ontario (London Sheet): Scale, 1:250,000, or 3.95 statute miles to an inch. Department of the Interior, Ottawa, 1905.

A sheet of the "Standard Topographical Map." It does not attempt to show the relief of the country, but gives the Land Office Surveys, the railroads, and other cultural features.

CANADA.—Relief Map of the Dominion of Canada. Natural scale, 1:6,336,000, or 100 statute miles to an inch. By James White, Geographer, Department of the Interior, Ottawa, 1904.

A very interesting map. Tints of brown represent contours of elevation, six shades and white showing altitude from sea-level to over 10,000 feet. The Height of Land dividing the Arctic from the Atlantic and Pacific basins is given, and the drainage and railroad systems are very clearly indicated. On so small a scale the features of relief must, of course, be greatly generalized, but nothing more refined than this map is needed to show the broad, distinguishing characteristics of the surface.

UNITED STATES.—Geologic Atlas of the United States. No. 119. Fayetteville Folio. Arkansas–Missouri. 1905.

The quadrangle lies chiefly in the Springfield plain of the Ozark region, in N. W. Arkansas, between Latitudes 36° and 36° 30′ N. and Longitudes 94° and 94° 30′ W. The accompanying letterpress describes the physiography and divisions of the Ozark region. Maps—1, Topography; 2, Areal Geology.

UNITED STATES.—Map of the Western Part of North Dakota. Scale, 40 statute miles to an inch. Water Supply and Irrigation Paper, No. 17, U. S. Geol. Sur., Washington, 1905.

Shows the distribution of lignite along the Missouri and its tributaries in northwestern Dakota. The areas most favourably situated for irrigation in this region are the broad fertile terraces along the Missouri and its affluents. These terraces, however, are 15 to 100 feet in elevation above the streams. The lignite area was investigated to consider the possibility of irrigating about 250,000 acres on these terraces by pumping from the rivers directly, using lignite as fuel. On the whole, the investigation was encouraging, and opportunities to reclaim arid lands appear to exist in the larger flats of this part of Dakota.

UNITED STATES.—Land Classification Map of the Gila River Forest Reserve, New Mexico. By T. F. Rixon. Scale, 1:255,660, or 4 statute miles to an inch. U. S. Geological Survey, Washington, D. C., 1905.

Illustrates Professional Paper No. 39 on "Forest Conditions in the Gila River Forest Reserve, N. M." Tints show the woodlands, timberless areas, and the estimated quantity of timber per acre in the tracts of yellow pine.



XUM

CHILE.—Tierra del Fuego. Puertos en la Parte Occidental del Canal Beagle. Oficina Hidrográfica, Valparaiso, 1904.

Surveys on scales of .3, .5, and .6 mile to an inch of ports Edwards, Almeida, Quo-Vadis, Burnt, Fanny, Estrecho, Huemul, Fortuna, Townshend, Util, Engaño, Ballena, and Langlois. Soundings in meters.

## AFRICA.

CONGO FREE STATE (Series of 4 Maps). Scale, 1:12,000,000, or 189.3 statute miles to an inch.—*Scot. Geog. Mag.*, No. 4, Edinburgh, 1905.

These maps, in all respects worthy of Bartholomew's well-known map house, were presented to the *Scottish Geographical Magazine* by Mr. J. G. Bartholomew. It was a handsome present, and will be very useful also to all students of Africa, for not even the Belgian maps show so fully the present knowledge of this vast region and of its exceptional development. Sheet 1 shows the orographical features, with six tints for elevations between sea-level and 4,000 meters; also the extent of navigation, railroads constructed and projected, and caravan routes. Sheet 2 is coloured to show the distribution of dense forests, prairies and woods, grazing, barren lands and steppes, together with Protestant and Roman Catholic mission stations. No. 3 shows the administrative districts, and distinguishes from one another the chief town, the Government stations, and the commercial stations in each district. No. 4 shows belts of cultivation, some of them very broad along the rivers, the great inner region of the rubber industry, extending from Lake Tanganyika, in the east, almost to Matadi, in the west, the colour of the area of greatest production being accentuated. The distribution of palm oil, ivory, hides, and other commercial products is printed in red letters, and an inset shows distribution of population, colours indicating thinly, well, and densely-peopled areas.

SAHARA.—Esquisse Géologique de la Région de Figuig. Par E. F. Gautier. Scale, 1:500,000, or 7.8 statute mile to an inch. *Annales de Géog.*, No. 74, Paris, 1904.

EGYPT.—The Nile. Scale, 1:12,000,000, or 189.3 statute miles to an inch. Survey Department, Cairo, 1904.

A sketch map, showing the limits of the Nile basin, with all affluents indicated to their extreme sources, as far as they are known. Illustrates "The Nile in 1904," by Sir William Willcocks.

EGYPT.—Perennial Canal System of Lower Egypt. Scale, 1:1,195,000, or 18.7 statute miles to an inch. Survey Department, Cairo, 1904.

Shows the canals and drains necessary to supply perennial irrigation through the Nile delta. Drains are required to prevent over-saturation of the soil. Illustrates the section on "Perennial Irrigation" in "The Nile in 1904," by Sir William Willcocks.

EGYPT.—Proposed Wadi Rayan Reservoir, showing the Fayoum. Scale, 1:500,000, or 7.8 statute miles to an inch. Survey Department, Cairo, 1904.

The Wadi Rayan is a depression in the desert to the south of the Fayoum, and separated from it by a limestone ridge. It is proposed to use this depression as a reservoir in completing the perennial irrigation of Lower Egypt. The central part of the depression is 40 meters below sea-level. Illustrates "The Nile in 1904," by Sir William Willcocks.

ANGLO-EGYPTIAN SUDAN.—The Albert Nile from Gondokoro to the Sobat Junction. Scale, 1:2,000,000, or 31.56 statute miles to an inch. Survey Department, Cairo, 1904.

In "The Nile in 1904," by Sir William Willcocks. The map shows the distribution of *sudd* between Gondokoro and the Bahr-el Ghazal, with the forest and swamp areas along this part of the Nile.

ANGLO-EGYPTIAN SUDAN.—Bahr el Gebel (the Nile between the Albert Nyanza and Lake No). Scale, 1:500,000, or 7.8 statute miles to an inch. Survey Department Egypt, Cairo, 1904.

A detailed map of that part of the Nile extending from 2° to 9° 30′ N. Lat. Tints show the forest areas, the grass and thorn bush regions, and the marshes along the river. The scale is large enough to emphasize the contrast between the usually broad Nile below Dufile and its very contracted width and numerous rapids among the gorges between Dufile and Rejaf. The distance along the river from Albert Nyanza is indicated for every 50 kilometers.

ABYSSINIA.—Lake Tsana. Scale, 1:300,000, or 4.73 statute miles to an inch. Survey Department Egypt, Cairo, 1904.

This map is based upon that of Dr. Anton Stecker, with additions from recent surveys by the Egyptian Government. It is the most complete map of the lake from which the Blue Nile issues yet published. The surveyors found that the map made by Dr. Stecker during his travels in 1881 was a good representation of the lake, though subject to correction in detail, especially on the south and southeast sides. The catchment area of the lake on its west and southwest sides appears to have been slightly overestimated. The normal annual oscillation of the lake's level is about 1½ meters. The map accompanies the special note on Lake Tsana by Mr. C. Dupuis in Sir William Garstin's *Report* upon the basin of the Upper Nile.

## ASIA.

TOPOGRAPHICAL MAP OF THE JAPANESE EMPIRE.—Scale, 1:1,000,000, or 15.7 statute miles to an inch. With insets of Formosa and the Riu-kiu Islands, and of the Kurile Islands, scale 1:2,000,000, or 31.5 statute miles to an inch; and a hypsometrical and bathymetrical chart, scale 1:5,000,000, or 78.9 statute miles to an inch. Contour intervals 200 meters, excepting lowest two, which indicate 100 meters each. Geological Survey of Japan, 1899.

Shows most of the settlements in the empire, from city to hamlet. The nomenclature is in English and very clear, but somewhat veils the contour lines, which would not be easy to read in any case, as the scale is small. The map gives a large amount of information, most of which is clearly expressed; but the effect of representing topography by contours in a very mountainous country on so small a scale is disappointing.

TIBET.—Tibet and the surrounding regions. Compiled from the latest information. Scale, 1:3,800,000, or 59.9 statute miles to an inch. Roy. Geog. Soc., London (revised 1904).

The map was originally published in the *Geog. Jour.* in July, 1894, ten years before its revision. Routes and surveys of later explorers have been inserted.

## EUROPE.

EUROPE.—Bartholomew's Railway and Steamship Map of Europe and the Mediterranean. Scale, 5:448,960, or 86 statute miles to an inch. John Bartholomew & Co., Edinburgh, 1905. (Price, 1s.)

One of the Bartholomew series of travelling maps. The main railroads and many of their connections are shown, together with ports, their sea connections, and the distances between them.

ENGLAND.—Bartholomew's New Reduced Survey (Aldershot District). Scale, 1:126,720, or 2 statute miles to an inch. John Bartholomew & Co., Edinburgh, 1905. (Price, 2s.)

Seven tints for contours of altitude. The driving and cycling roads are shown in brown, the roads being distinguished as main, secondary roads, and footpaths. One of the firm's fine reductions from the Ordnance Survey.

## ATLASES.

STIELER'S HAND ATLAS.—Neue neunte Lieferungs-Ausgabe. 100 Karten in Kupferstich. Lieferungen 43 and 44. Justus Perthes, Gotha, 1904. Price, 60 pf. for each part containing 2 map sheets.

The new sheets in this installment of the atlas, now nearly completed, are the two northern sheets of Africa, "West Sahara," by B. Domann, covering northwest Africa, between the Mediterranean and the Sudan; and "Ost Sahara," by C. Barich. The scale, enlarged from 1:10,000,000 in the Eighth to 1:7,500,000 in the present edition, is none too large for the array of new geographical facts collected in this part of Africa. The surveys that the French have pushed southward into the Sahara, the correction of erroneous place-determinations there, and the larger-scale maps, with many new place-names, relating especially to Morocco and the French Sudan, have contributed most of the fresh data.

The most notable changes in the sheet "Ost Sahara" are found in Egypt in the mountain region between the Nile and the Red Sea. Mr. Barich has finely generalized the detailed maps which the Egyptian Survey Department has made. This is the first atlas sheet on which this long-neglected corner of Africa is represented with all its more considerable features.

The plates of the general maps of South America and Asia were revised by Habenicht.

TASCHEN-ATLAS UBER ALLE TEILE DER ERDE.—In 36 Haupt- und 70 Nebenkarten, Von Chr. Peip. Mit geographisch-statistischen Notizen von Otto Weber. Deutsche Verlags-Anstalt. Stuttgart und Leipzig, 1904.

One of the excellent pocket atlases produced in Germany, and sold at a low price. It is a ready-reference atlas, showing, with a fair degree of clearness, the most important places and the chief physical features of all parts of the world. There are 36 plates, some of which—South Africa as to railroads, for example—might have been revised with advantage, as they are not quite up to date. As 23 of the 36 sheets are given to Europe, the maps of that continent are much more detailed than those of other parts of the world. The seven sheets given to Germany, on a scale of 1:3,000,000, make a fairly complete map fitted to the pocket, for the scale is half as large as those of the maps of the leading European States in the best German atlases. There are many insets, chiefly town plans, and 80 pp. of geographical statistics.

XUM

## BOOK NOTICES.

**Grundriss der Wildbachverbauung. Von Ferdinand Wang, k. k.** Forstrat, etc. Zweiter Theil. Mit 85 Abbildungen und 79 Figuren im Texte. Leipzig, Verlag von S. Mirzel, 1903.

This second volume of the author's large work on the regulation of mountain torrents and the reforestation of dangerous slopes contains the practical application of the theories of the phenomena discussed in the first volume. It appeals especially to the engineer interested in similar subjects by the extensive and instructive records, illustrated by many fine pictures and diagrams, of the methods used and the results accomplished in this work in the European countries. The main objects of the work are protection from the dangerous sudden floods in mountainous regions, reduction of the transporting and erosive power of mountain torrents, regulation of the water supply in the adjoining districts, prevention of landslides, protection from avalanches, etc. The book tells how these objects have been secured by regulating the grades of ravines and gullies, or terracing them, by means of dams or brush fences, by lining the bottoms or the sides of the streams with stones or boards, by covering unsafe slopes with sod, or sowing them with certain mixtures of grasses whose roots have been proved by experiment to hold the soil better than others, and finally, of course, planting them with shrubs or trees. Each of the various methods is fully discussed as to the details of the work itself, the special qualities of each, the applicability of the individual scheme to different conditions; and estimates of the average cost are given. As an especially interesting fact it must be noted that in Austria very good results have been obtained for a number of years by employing convicts from the State prisons to do the work, and thereby making them of some use for the State in return for their board and lodging. This does not mean that the State obtains their work much cheaper than it would that of regular workmen, for, although their wages are naturally very low, they are given credit for the money, and do not receive it before the end of their term, when the whole sum is handed over to them for their new start in life. Their support in those mountain camps, often many miles away from human habitations, is considerably more expensive than it would be in the prison. But the arrangement secures a steady supply of willing hands, since being sent to the camp is a privilege granted for good behaviour, and the exchange of the prison atmosphere for outdoor life and exercise is so much appreciated by the men that the only punishment for insubordination or laziness—return to the prison—has hardly ever been used, and no attempts to escape from the camps have been recorded. Their work seems to redeem even the doubtful past of those men in the estimation of their neighbours, for in several cases free workmen have been found willing to work together with the convicts, and an instance is even quoted of a fire in one of the villages at which the whole camp set out to assist the firemen and of their own accord returned, each and every one of them, to their place of work. It need not be said at what advantage, physically and morally, such a man will find himself at his re-entrance in the world in comparison with his fellow-prisoners who served their terms behind the bars. It seems that both the economic and philanthropic sides of this experience deserve the attention of all who wish to start similar work in this country.

The last part of the book is given over to legislation on, and progress of, the

work in the different countries. Reports are available from France, Austria, Switzerland, Italy, Germany, Russia, Greece, Spain, and Japan. France is by far the leading country. Bills forbidding deforestation of slopes were issued there as early as 1718 and 1753. The present laws date from the middle of the 19th century, the last of April 4, 1882, requiring a survey and division into so-called "périmètres" of all the Alpine, Cevennes, Plateau Central, and Pyrenees districts. Endangered perimeters are bought up by the State and then improved. The towns and the landowners contribute toward the cost of the improvement, if they are directly benefited by it. Up to 1892 the work achieved included the reforestation of 82,429 hectares of land, the building of 384 first-class, 1,906 second-class, and 17,539 "rustic" dams, the regulation of 340 kilometers of brooks and the draining of 218, the building of 3,875 kilometers of roads, and of 978 kilometers of fences, at a total cost of 27½ million of francs. Switzerland and Austria are next, both in legislation and in the extension of the work; in Germany there used to be need for it only in Alpine districts, but similar work has recently been started in the basin of the Oder, whose floods have been the most destructive in the empire during the last decade. In the other countries, including even Italy, with its large share of Alpine territory, the work is still in the initial stage, while Japan has developed some methods of her own, and adopted others of European origin, whose combination has resulted in some quite remarkable work. M. K. G.

**Handbuch der Erdbebenkunde. Von August Sieberg,** Erster Assistent am Meteorologischen Observatorium in Aachen. Mit 113 Abbildungen und Karten im Text. Braunschweig, Druck und Verlag von Friedrich Vieweg und Sohn. 1904.

This book is intended, according to an introductory note of the author (*a*) to give a summary of the most important facts, principles, and problems of seismology for the information of the non-specialist, and (*b*) to furnish the specialist with a working knowledge of modern methods and apparatus for seismological work. This twofold purpose practically divides the book into two quite different parts, each of which must be judged from its own point of view. As a separate unit each part ranks with the best that has been published in this line. The introduction and Chapters I and II form the general part. They contain a presentation of seismic phenomena which any one desirous of a well-balanced general information on the subject will easily understand and enjoy. Eminently readable, and free from technical detail, it reminds one of Geikie's class-books, in that it proves that often the best introduction into the elementary aspects of a science can be given by the scientist who knows best how to discern between the essential and the more secondary aspects of the subject. In a brief but complete and satisfactory way, scholarly in spirit and simple in presentation, the main phenomena of seismic activity are discussed, the geographical distribution of earthquakes, both on land and beneath the sea (the latter called "seebeben" sea-quakes, in opposition to earthquakes proper), their causes, foci, epicentra, transit, duration, intensity, frequency, effects, and minor phenomena accompanying the shocks.

The second part, embracing Chapters III and IV, contains descriptions of the various seismic instruments, directions for their use, and hints for their value under various conditions, formulas for seismic calculations, practical suggestions on the collection of seismological data and how to work up the statistical material gathered from various sources, and the like. It is exclusively a guide for working seismologists, and the question may not be out of place whether it would not be wiser, after

all, in a new edition, to publish these chapters separately as a manual for seismic observations and replace them in the book by a reduction of their contents to the scope of the preceding chapters. Such a change might greatly increase the saleability of the book, since the general part is of only limited value to the professional seismologist, who, when in need of a reference, is likely to consult a larger handbook, while the general reader may not be willing to pay for the whole of such an expensive book when only one half is within the limits of his understanding.

The last chapter (V.), untechnical again, contains a general survey of the history, present tendencies, modern methods, and practical application of seismology, including reports on the work accomplished in the various states of the civilized world, a list of the existing seismological stations and their apparatus, and reports on the proceedings of the first two International Seismological Conferences, in 1901 and 1903. Two indices, one of names and one of subjects, greatly add to the usefulness of the book for the reader; and so do reference tables, for the calculation of distant tremors for the scientist. The book is well illustrated with pictures and diagrams, which, among a number of well-known typical illustrations, include also much that is not found in the average text-book. M. K.G.

**Actual India. By Arthur Sawtell.** viii and 120 pp., map and index. Elliot Stock, London, 1904.

It has been impossible hitherto to get a clear idea of the somewhat complicated system of British government in India without the uninspiring labour of consulting a number of large books, including official publications. Perhaps the difficulty of obtaining this knowledge may explain the phenomenon to which Lord Curzon recently referred when he said he sometimes thought that the most remarkable thing about British rule in India was the general ignorance about it in England. This little book gives just the information that is needed to make clear the methods of British rule and the fundamental policies that shape the measures of the Indian Government and direct its work.

After an excellent chapter on the geography of India, the book sketches the leading features of the Indian administration of to-day, shows its relations with Britain, the nominal control of Parliament, what the Government consists of both on its executive and its legislative side, describes the Provincial Council, local self-government, the India Civil Service, the district as the unit of administration, and other features, from the Viceroy, Governors, and Judiciary to the Collectors of Districts. Such topics as the defences of India, its foreign policy, the cost of government, "The Prosperity Problem," industrial development, and English influence have each a chapter to themselves. The book is not merely a compendium of facts, for the author is avowedly an admirer of the British system in India, and his pages evince some of his enthusiasm; but he avoids partizanship, and his work will fill a void that is felt by all who wish to have an intelligent idea of Indian affairs.

**Kleines Orts-Lexikon von Osterreich-Ungarn. Von Dr. K. Peucker.** x und 142 Ss. Artaria & Co., Vienna, 1904. (Price, K. 2.50.)

The third edition of a little book that is convenient to handle and is packed with information about the towns of Austria-Hungary. It gives the name of every place of 2,000 or more inhabitants, and of all other places of importance for tourists, commerce, or communications, with much condensed information, including the height above the sea. Towns of more than 15,000 inhabitants have detailed tables showing the movement of population in each district, the percentage of growth or loss, and many other facts.

XUM

**Les Çomâlis. Par Gabriel Ferrand.** xiv et 284 pp. (No index.) Ernest Leroux, Paris, 1903.

This is the first of a series of volumes which will present "Materials for the Study of Mohammedan Countries." This series is under the editorship of Prof. A, Le Chatelier of the College of France, who is to be congratulated upon opening this collection of studies with a book that so well presents and classifies the existing information about Somaliland. Mr. Ferrand says that the barbarism and fanaticism of the Somalis are responsible for our ignorance of their country in nearly all its aspects. He describes what is known of the physical geography of Somaliland, sketches the history of the people, according to the leading authorities, outlines the explorations of the XIXth Century, and treats of the languages, which are a part of the Ethiopic group of the Hamitic. He then describes the tribes in detail, with separate chapters on their social organization, their music and songs, Christianity and Islam, and the political partition of the country. Perhaps the best summary of information that has appeared on the Mahdi, Mohammed Ben Abdallah (the Mad Mullah)—who he is, what he represents, and the campaigns against him—is found in the 38 pages of the last chapter.

**Zwei Jahre unter den Kannibalen der Salomo-Inseln. Von Carl Ribbe.** vii und 352 Ss., 3 Karten, 14 Tafeln, Abbildungen und 10 Beilagen. (Index) Herman Beyer, Dresden-Blasewitz, 1903.

Mr. Ribbe is a naturalist who improved the opportunity to spend two years (1894–96) among the islands of the Solomon Archipelago. He made large collections in natural history and studied the natives as far as he was able to do at the white stations along the coasts. He lived most of the time at the Shortland Islands, just south of Bougainville, and his trips along the coasts did not extend farther south than the Central islands of the New Georgia group; thus his attention was confined to the northern third of the archipelago.

He brings no further information about the interior than any of his predecessors, but his large book is one of the most valuable contributions yet made to the knowledge of this archipelago. It is imbued with scientific spirit, abounds with information, and is especially rich in descriptions of the natives. The appendix is devoted to anthropological measurements, and a large number of tracings of facial profiles, hands, and feet are given. Vocabularies collected in various islands are arranged for purposes of comparison.

None of his predecessors gives the islanders a worse reputation than the present writer. He says that no more treacherous peoples exist, and that the white man is not safe for a minute without a revolver at hand. And yet some of the natives buy their potatoes and rice from the whites, and are very glad to sell him their large crops of cocoanuts. They come down to the coast to transact business with the trader in the daytime, and incidentally try to ascertain the position of his bed, hoping to be able to shoot him at night through the wall. The barter trade is very profitable, which is all that keeps the whites along the coasts. Some of them bring their wives and children to the islands, and the women, Mr. Ribbe says, are as brave and wary as the men folk.

No white man ventures inland; the trader keeps to the sea edge, where he dries his coprá and lives among his barter goods. The result is that almost nothing is known accurately of the interior of the islands, and the larger islands are absolutely untraversed. We know something of the topography, because sketches and surveys have been made from the decks of vessels. Such dominating features, however, as

the Kronprinz Range, which forms the backbone of Bougainville, have never been reached by an explorer, and the largest-scale maps are likely to give only such information as this printed across the blank spaces of the islands: "Flat from this point to the coast and well wooded;" "many villages lie from 5 to 10 kilometers inland;" "coast region wooded," etc.

The illustrations, chiefly from the author's photographs and drawings, show the natives in their physical characteristics; groups of them are seen in their vocations or dances, and their industrial processes, such as weaving and pottery-making, and their musical instruments, fishing appliances, and other arts are illustrated. The index facilitates reference to every page, and the work is a storehouse of information which is not likely to be supplanted for many years.

**Paris and Environs. By Karl Baedeker.** liv and 458 pp., 13 maps, 38 plans, besides Index of Streets and Plans of Paris, 42 pp. Index. Karl Baedeker, Leipzig, 1904. (Price, M. 8.)

The fifteenth edition of this handbook. Like its predecessors, it will go far to make the traveller independent of guides and help him to plan for the economic expenditure of time and money. The accounts of the routes from London to Paris include maps of Boulogne, Amiens, Calais, Dieppe, Rouen, and Le Havre. The American tourists, who now land directly at Cherbourg, without visiting England, will be likely to consider a map of Cherbourg a valuable addition to the volume.

**Into the Yukon. By William Seymour Edwards.** xii and 312 pp., 98 Illustrations and two maps. No Index. The Robert Clarke Co., Cincinnati, 1904.

This is a sketchy, brightly-written book of travels, with no waste of words and crowded with crisp bits of description, and just the kind of information to enlighten the reader on the things he most desires to know concerning a place or region. It covers the author's routes from Cleveland to Dawson, on the Yukon, and through our Pacific States, between Puget Sound and Los Angeles, and back to St. Louis. The small half-tone pictures are a feature of distinctive excellence. One picture gives a glimpse of the first agricultural fair held at Dawson, of which the author says:

> The display of vegetables and flowers especially astonished me. The biggest beets I have ever seen, the meaty substance all clear, solid, firm, and juicy. Potatoes, Early Rose, and other varieties, some new kinds raised from seed in three years—large, a pound or more in size. And such cabbage, cauliflower, and lettuce as you never saw before. Many kinds full-headed, and able to compete with any produced anywhere. All these raised in the open air, on the rich, black bottom and bench lands of the Yukon.

There was also a display of fine ripe strawberries, and the "show of oats, rye, barley, wheat, and timothy and native grasses, as well as of red and white clover, proved that this Yukon region is capable of raising varied and nutritious crops necessary for man's food, and for the support of horses and cattle." The author says that not a few men, instead of hunting for gold, have gone into raising vegetables, hay and grain, and get fabulous prices for their products.

**Agricultural and Pastoral Prospects of South Africa. By Owen Thomas.** vii and 335 pp., Map and Index. Archibald Constable & Co., Ltd., London, 1904. (Price, 6s.)

The author treats of South Africa from Cape Colony to Northern Rhodesia, north of the Zambezi, in its agricultural and grazing aspects. He deals first with the

country in its physical and geological features, its soils, and climatic conditions. Then he discusses the questions of land tenure and land values, the various systems of farming, the respective advantages and disadvantages of agriculture and stock-farming, and devotes a few chapters to the diseases of animals, insects, agricultural credit, colonization, native labour, and the Boer. The last third of the book is devoted to the study in detail of farming and grazing in each of the political divisions of South Africa. The book is filled with the greatest variety of information for all who are especially interested in the important practical questions it treats. The map, on a a scale of 80 statute miles to an inch, is excellent for its purposes.

**The Truth about Morocco. By M. Aflalo.** xxii and 283 pp. No Index. John Lane, New York and London, 1904. (Price, $1.50.)

Mr. Aflalo, for ten years, held an official position in Morocco under the late Sultan, and during the Regency, before the present Sultan ascended the throne. His unsurpassed opportunities for learning the facts about Morocco entitle his opinions on the social and political status of the country to much respect. The purpose of his book is to set forth the reasons for his opinion that the recent Anglo-French agreement, by which Morocco is practically placed under the full control of France, was a great blunder, and that it will be against the interests of the world at large, as well as of Morocco, to carry it out. Whether or not his readers agree with him they will be glad of the opportunity to read a book in which so many valuable facts relating to the political and commercial position of Morocco are so well summarized as in this volume.

**The Origin and Growth of the English Colonies and of their System of Government. By Hugh Edward Edgerton.** viii and 224 pp., 8 maps, Appendix, and Index. The Clarendon Press, Oxford, 1903.

This is a new edition of the "Introduction to a Historical Geography of the British Colonies," written by C. P. Lucas in 1887. The book, however, has not merely been edited and revised, but its scope has been enlarged. Speaking generally, the author affirms that a number of the European States became colonial powers, not with any conscious aim of acquiring possessions, but, as it were, by accident. They were seeking to open new trade routes, and thereby to develop commerce, and "found in the East that trade with uncivilized natives was too precarious to be profitable, unless it could depend upon bases possessed by the European Power, which should protect the trader; while in the West the new world, opened out by Columbus, proved a sufficient end in itself." The volume not only presents a study of the rise and progress of the British Colonial Empire, but precedes it with a lucid and detailed account of the manner in which the system of colonial government in general was developed in the course of three centuries.

**The Penetration of Arabia. A Record of the Development of Western Knowledge concerning the Arabian Peninsula. By David George Hogarth.** xiii and 359 pp., 30 Pictures, 22 Maps and Plans, and Index. Frederick A. Stokes Company, New York, 1904.

This volume is one of the excellent series giving "The Story of Exploration." It is not only a history of the exploration of Arabia, with critical judgment as to the value of each explorer's contribution, but also a summary of the whole work up to this time. Arabia is not yet entirely visible to Western eyes, but the main features of the interior, as well as the coast-lines, are now understood; and, in the author's

opinion, when the present political changes and convulsions have ceased, Europeans will complete the penetration of this region.

After a summary of the slow and meagre progress of Western knowledge of Arabia before recent times, Mr. Hogarth discusses the work of modern explorers, from Niebuhr, in the middle of the 18th century, to Hurgronje, in 1885. The list is not a long one, but it includes at least 12 or 15 men of varied and great gifts like Niebuhr, Burckhardt, Burton, Palgrave, Halévy, Blunt, and others who hazarded themselves in a land that, away from parts of the coast, is almost naked and forbidding in every aspect. The author's estimate of a few of these men may briefly be given here, beginning with Niebuhr, who studied the fertile coast regions of the Yemen:

> The primacy always conceded to Niebuhr among Arabian travellers is not due to his priority in time, but to the priority of his merit. He and his party undertook a double task, to explore the most fertile part of Arabia known to Europe, and to collect there the best possible information about all the rest of the peninsula. Both tasks were carried out in a way which, when all circumstances are considered, is beyond criticism.

Of Burckhardt, who wrote the first modern description of Mecca, the author says:

> The credit due to Burckhardt is not for seeing many things in much of Arabia, but for seeing much in a little of it, thanks to his clear vision and the careful preparation of his mind by the study of native authorities. His glory is to have described not so much that was new to Western science as so much that was true then and is true still. He was the first of Arabian travellers to realize fully the explorer's obligation to serve all sorts and kinds of inquiry, and few travellers have left so little for the man who may come after them.

We have Richard Burton to thank for our knowledge of the wild granitic region of the ancient Midian, in the northern part of Arabia. He also traced the most eastern of the four possible routes to Mecca from the north:

> In his description of the capital of Islam, Burton has done little more than (in his own words) "pay homage to the memory of the accurate Burckhardt"; and as for the great Mosque, he was content to reproduce the plan of Ali Bey. * * * The vivid style and descriptive power of his narrative attracted an audience to which Burckhardt's sober journal had remained unknown and so greatly dominated popular fancy that at this day those who know that any European has tried to reach Mecca for the most part believe that Burton alone succeeded.

Hurgronje, landing at Jidda in 1885, spent five months in Mecca during the long interval between the departure and arrival of the pilgrim caravans, and was the only European, except, perhaps, Burckhardt, who saw the city under its normal conditions:

> This fact, added to his command of Arabic and profound acquaintance with native authorities upon the history of the Hijaz, makes his book on Mecca of especial interest. He gives an elaborate description of the town, bearing witness to Burckhardt's accuracy. Little seems to have changed, except the level of the residential part of the town, which is slowly rising round the great mosque and the holy houses. . . . The result is to leave the Ka'bah in a deep hollow, two or three metres below the streets, which receives all flood waters. By far the most valuable part of Hurgronje's book, however, besides the historical half of it, is that devoted to Meccan society; its street markets for slaves; its holy places and their guardians; its servile and freedman elements; its houses, festivals, and guilds; its vices of turbulence, bigotry, and lust, and its virtues of easy hospitality and humanity. Hurgronje's is as minute a study of Arab urban life as could be made from the purely European point of view.

The book is scholarly, like all the writings of its author. It is the result of a critical study of the literature of the subject from which Mr. Hogarth has evolved the history of the gradual unfolding before our eyes of the vast interior with its deserts, oases, lava fields, and routes; and after telling when, how, and by whom these various features were discovered, he presents Arabia, no longer piecemeal, but as a whole. The publishers have produced the book handsomely, and the two maps by

Bartholomew, already reviewed in the BULLETIN (Feb., 1905, p. 113), take their place with the sheet in the Ninth edition of Stieler's Hand Atlas as the best maps yet made of Arabia.

**Abessinien und die Evangelische Kirche. Von Carl Paul.** (Second Edition.) x and 148 pp. C. Ludwig Ungelenk, Dresden-A and Leipzig, 1905. (Price, M. 1.50).

This is No. 5 of the series entitled "Missionsstunden." The writer gives a chapter to the Abyssinians and their country, describes the Abyssinian Church (Coptic), "a Christian rock island in the midst of Islam, but spiritually palsied," tells the history of the evangelical missions and their progress, sketches the black Jews and their Jewish missions, and reports on the latest missionary undertakings.

**London and its Environs. Handbook for Travellers. By Karl Baedeker.** x and 471 pp., with index of streets and plans of London, 44 pp., 4 maps, and 24 plans. Fourteenth Revised Edition. Karl Baedeker, Leipzig, 1905.

This edition contains the most recent information down to October, 1904. Especial attention has been given to the description of the great public collections, such as those in the National Gallery, the British Museum, the Wallace Collections, the National Portrait Gallery, the Tate Gallery, and the South Kensington Museum.

**Russia, the Land of the White Czar. By E. C. Phillips (Mrs. Horace B. Looker).** viii and 186 pp., and 51 illustrations. Cassell & Co., Limited, New York and London, 1904.

A book written for young folks with the purpose of giving them entertaining information about the Russian Empire. Two boys and their families figure prominently, the idea being, apparently, that they will lend variety and animation to these comprehensive sketches, which take in the wonders of St. Petersburg and Moscow, the Samoyeds and their reindeer, prison life in Siberia, the Nizhni-Novgorod Fair, and many other aspects of the Empire. Some of the pictures are typical of high and humble life in Russia.

**The Climate of Australasia in reference to its Control by the Southern Ocean. By Prof. J. W. Gregory, D.Sc., F.R.S.** 96 pp., 18 Maps and Diagrams and 3 Appendices. Whitcombe & Tombs, Melbourne. (No date.) (Price, 1s.)

The Presidential Address delivered by Dr. Gregory before the geographical section of the Australasian Association for the Advancement of Science on January 11, 1904. In this suggestive monograph Dr. Gregory treats chiefly of the "influence of the oceanic circulation as its effects may be traced directly in the land masses of the southern hemisphere." He does not agree with the meteorologists who regard seasonal weather predictions as an unattainable vision. He cites the Indian Meteorological Department, which "has issued seasonal forecasts for the last fifteen years—and with brilliant success":

> Fortunately for Australasia, our meteorological conditions are far simpler than those of Europe, so that we may expect much greater certainty in weather prediction. I see no impossibility in future Australian meteorologists foretelling correctly a year ahead the general nature of the approaching seasons. But such insight will never come to us until we have done our part, and studied the hydrography of the Southern Ocean, with the same methods which have yielded such profitable results in the North Atlantic, and to India.

**The Geography of Victoria: Historical, Physical, and Political. By J. W. Gregory, D.Sc., F.R.S.** 290 pp., 116 Illustrations, Maps and Diagrams, 4 Appendices, Glossary, and Index. Whitcombe & Tombs, Limited, Melbourne, 1903. (Price, 3s. 6d.)

Dr. Gregory spent only about four years in Victoria, Australia, as Professor of Geology in the University of Melbourne, but he rendered important services to education in that State. One of them was the writing of this volume, the first to treat the geography of Victoria in relation to the development of its topography. He defines the different geographic divisions of the State, explains their relations, and treats the region with special fulness on the physiographic and economic sides. A careful reader of this book will not only see Victoria clearly revealed, but will also have before him the means of careful training in most branches of physical geographhy.

**Mexico Yesterday and To-day (1876–1904). By Bernardo Mallen.** 84 pp., City of Mexico, 1904.

The material progress of Mexico in the past thirty years has been remarkable. This book was prepared in various languages with authority of the Mexican Government, and distributed at the World's Fair in St. Louis. The book illustrates in a general and complete manner the great progress that Mexico has made in all branches of activity during its period of evolution. It is a comparison, with many statistical data, of the condition of Mexico in these two periods of history. Nothing could better emphasize the enormous difference between the revolutionary Mexico of 1876 and the Mexico occupied with peaceful pursuits of 1904, than the impressive and authentic facts and figures given in this volume.

**Ausgewählte Stücke aus den Klassikern der Geographie für den Gebrauch an Hochschulen. Zusammengestellt von O. Krümmel (Dritte Reihe).** vii and 208 pp., 21 Illustrations in the text. Lipsius & Tischer, Kiel and Leipzig, 1904. (Price, M. 2.50.)

Attention was called in the BULLETIN (1904, p. 189), to the first and second volumes of these extracts from the classics of geography. The present volume is the third and last of the series. It is gratifying to learn that the series has been favourably received in German high schools. There should certainly be a place for books filled with the best things in geographical literature and at the same time handsomely printed. The present volume contains "Vicissitudes in Climate caused by Geographical Changes," from "Principles of Geology," by Sir Charles Lyell; "Die Entstehung der Alpen," by Prof. Eduard Suess; "Die Lösslandschaften in nördlichen China und ihre Beziehung zu Zentralasien," from "China," by Ferdinand von Richthofen; "Über Abrasion und Transgression," from the same work; "Die allgemeine Geobotanik," by August Grisebach; and "Konstantinopel," by J. G. Kohl.

**Commercial Geography of the World. By A. J. Herbertson.** 420 pp., Maps, Indexes and Appendices. W. & R. Chambers, Limited, London and Edinburgh, 1905. (Price, 3s. 6d.)

The first part, treating of the British Isles, is a revised edition of "Commercial Geography of the British Isles," which was published in 1899. The second part takes in the rest of the world, and each part has its own pagination, index, and statistical appendix. They are thus two books in one volume, presenting for the

student a simple treatment of the whole subject of commercial geography. About three-fourths of the book are given to the British Empire; and the concluding chapter presents the most salient features of our own commercial geography, very concisely expressed, to be sure, as only 12 pp. are given to the United States.

**A. Hartleben's Kleines Statistisches Taschenbuch über alle Länder der Erde.** (Zwölfter Jahrgang.) Nach den neuesten Angaben bearbeitet von Professor Dr. Friedrich Umlauft. Wien und Leipzig, 1905.

The twelfth year of publication of this small but authoritative compilation of the statistics of all countries. The four pages on the United States, for example, give the form of government, the number of States and Territories, the name of the President, the area, population, nationalities, religions, national finances, number of vessels in the merchant marine, trade statistics, length of railroads and telegraph lines, number of post offices, the weights, measures, and money, statistics of army and navy, a list of cities and their population, and the area and population of the States, Territories, and Colonies.

Hartleben's Statistische Tabelle über alle Staaten der Erde for 1905 gives the same information on a large sheet.

**Report upon the Basin of the Upper Nile; with Proposals for the Improvement of that River. By Sir William Garstin, Under Secretary of State for Public Works in Egypt.** To which is attached a report upon Lake Tsana, and the rivers of the Eastern Soudan, by Mr. G. Dupuis. With Maps and Appendices. National Printing Department, Cairo, 1904.

**The Nile in 1904. By Sir William Willcocks.** National Printing Department, Cairo, 1904. Spon & Chamberlain, 123 Liberty St., New York. (Price, 9s.)

Geographers will be especially pleased to add these two volumes to their sources of information. No writer on any of the natural phases of the Nile basin, or on the efforts to develop its resources, can afford to neglect them. They give the results of all the latest explorations and studies in a field where there was, and still is, much to learn; a considerable amount of the data usually employed in describing the Nile basin, and the régime of its waters, will have to be revised in the light of the information now supplied.

Sir William Garstin's *Report* is one of the finest specimens of book-making yet produced by the Egyptian Ministry of Public Works. It is a handsome folio of 290 pages printed in large type, and with numerous maps, plans, and photographic reproductions. Sir William describes his recent visit to the Equatorial Lakes, summarizes the result of five years' consecutive observations on the Bahr-el-Gebel (the Nile from Albert Nyanza to the Bahr-el-Ghazal), and incidentally coördinates with his own narrative geographical information supplied by earlier observers. The result is a readable book, in spite of its technical character.

There are as yet no means of ascertaining the altitudes along the river from Victoria Lake to Khartum, as barometric and hypsometric determinations afford the only data for the relief of the country, and the results are therefore only approximate. Within two or three years, however, spirit-levelling will probably be carried up the White Nile and the Bahr-el-Gebel.

There has been considerable discussion as to whether the region of the Victoria

Nyanza was in process of desiccation, it having been asserted that a steady fall in the levels has occurred during the last 20 or 30 years. There is no doubt that a lowering of the surface has been in progress for the past 7 years; but Sir William Garstin says that during this period the rainfall was much below the average, and, in 1899, failed almost completely in the northern part of the lake. If there were a permanent fall in the Victoria Nyanza it could only be accounted for either by a general reduction in the annual rainfall or by the lowering of the bar at the Ripon Falls, the outlet of the lake. A careful examination of the Falls shows no sign of any degradation of the rock ridge, which will, of course, be lowered in time; but the process will be extremely slow. It is probable, therefore, that the fall in level is not a permanent one, but that when heavy rains set in again the lake will rise to its former level. This view is confirmed by later information, recorded in a footnote, reporting heavy rains, the rising of the waters and the disappearance under the flood of the land gained in the past few years. The maximum oscillation of the lake is from 1 to 3 feet.

It is impossible in this brief review to give any summary of the author's detailed description of the Equatorial head streams and lake sources of the Nile, or of the wide areas in which they are placed. He makes one statement, however, that will startle many writers who have repeatedly affirmed that the Equatorial Lakes supply the larger part of the water that reaches Egypt:

> It may be stated, with confidence, that the White Nile contributes practically nothing to the flood which reaches Egypt. This is entirely derived from the Blue Nile and from the Atbara. On the other hand, the supply passing Aswan [Assuan], during the spring and early summer, is due, almost entirely, to the waters of the great lakes, brought down by the White Nile (p. 171).

With regard to the future utilization of the Nile, Sir William Garstin says that the two main objects are to increase the water supply of Egypt in the summer and to secure similar advantages for the Sudan in the same period. Both these ends are of equal importance, though an ample water supply for Egypt is likely to bring in an earlier return for the expenditure. He thinks the best way to secure these results would be

> to reserve the waters of the Blue Nile for the improvement of the countries bordering that river, while Egypt, and the area of the Nile Valley lying to the north of Khartum, shall derive their summer supply from the sister river (p. 172).

He describes the schemes for the regulation of the two great lakes that feed the White Nile and for the prevention of the waste of water, through evaporation, caused by the vast swamps through which the river passes in the upper part of it course. He gives the grounds upon which he concludes that the regulation of the Victoria and Albert Lakes will present no insuperable difficulties; as to the improvement of the channel of the Bahr-el-Gebel so as to prevent the great wastage of water in the marshes, his proposal is to construct an entirely new channel for the Bahr-el-Gebel, which would not be much larger than one of the great canals of Egypt, and would probably have a north and south alignment from Bor to the Sobat confluence, a distance of 340 kilometers. The object would be to preserve the regulating power of the marshes for the flood water and, at the same time, to prevent the present wastage in the river during the dry season.

Sir William Willcocks' book, "The Nile in 1904," is a volume of 225 pages, 21 plates and maps, and a large number of tables, the whole comprising a summary of our present knowledge of the waters in the Nile Basin, the present state of irrigation, and the improvements needed to render it perennial. The book embraces, either in summary or detail, the large additions to information that the studies of the past few years have yielded. It supplements the great book of Lombardini, published

over forty years ago, and brings knowledge down to the present time. Sir William Willcocks says the mystery of the Nile is still far from being solved, but that enormous steps in advance have been made by the publication of Sir William Garstin's Report above noticed ; and, it may be added, by this volume, which has closely followed it from the press.

The book first describes the courses, slopes, velocities, catchment basins, and discharges of the Nile and its tributaries, and treats of the climate and geology of the Nile Valley. In the second chapter the tributaries of the river and the various reaches of the Nile itself are discussed. Chapter III is devoted to the utilization of the Nile, the river in flood and in low supply, the soils of its valley, and the different methods of irrigation and flood protection. Chapter IV deals with projects for water storage and flood control, the change from basin to perennial irrigation, and the development of the Sudan. Chapter V, written by Mr. H. J. L. Beadnell, is descriptive of the geology of Egypt, its economic projects, and the Egyptian oases in the Libyan Desert.

The appendices contain a large number of tables on the discharges of the Nile and its tributaries at various points, the low and high water levels, the canal discharges and temperature, and barometrical, precipitation, and other tables for different parts of the Nile Basin.

Both writers agree that the Blue Nile and the Atbara contribute to Egypt not only most of the fertility but also most of the water. Sir William Willcocks says:

> If we take 3,000 cubic metres per second as the average annual flow past Assuan we may say that the White Nile supplies 24 per cent. from more than half the area of the whole basin; the Blue Nile, 65 per cent. from one-tenth the area, and the Atbara 11 per cent. from one-twelfth of the area. The Gazelle River drains about one-sixth of the total area and adds practically nothing to the discharge.

The mean discharges for 1902 of the White Nile, Blue Nile and Atbara together were 3,560 cubic meters per second. Sir William discusses at length the great irrigation problems upon the solution of which depends the full utilization of the soil of Egypt.

> Egypt has a total irrigable area of 6¼ millions acres. Of this area, 250,000 acres, which are to-day inundated in flood and lie along the edge of the deserts, must continue to be inundated in flood for all time to prevent the sands of the desert from spreading over the Nile Valley. Their value is £5,000,000. Four million acres are perennially irrigated. They have a mean value of £55 per acre, and a total value of £220,000,000. Of the remaining 2,000,000 acres, two-thirds are irrigated only in flood, and one-third is not irrigated at all. These 2,000,000 acres have a mean value of £25 per acre and are worth £50,000,000. The land of Egypt may be considered as worth £275,000,000 to-day. If it were possible perennially to irrigate the 2,000,000 acres which are without such irrigation their value would be increased by £30 per acre, or by £60,000,000.
>
> The problem is how to provide perennial irrigation for these 2,000,000 acres, and so add £60,000,000 to the wealth of the country. To do this Egypt requires reservoirs capable of storing 4 milliards of cubic metres of water.

Sir William Willcocks' project for providing all the water required for perennial irrigation has been outlined in the BULLETIN (1904, No. 4, p. 233). In brief, it is to add 6 meters to the height of the Assuan dam, which will then hold up another milliard of cubic meters of water; this improvement to be supplemented by building the projected Wady Rayan reservoir, which, in conjunction with the Assuan reservoir, will supply all the water required for perennial irrigation.

Sir William commends the construction of the railroad between the Red Sea and the Nile now in progress, and advises the building of the proposed railroad along the Nile between Dongola and Abu Hamed. These two railroads are essential to the development of the Sudan. When they are in working order, irrigation projects may be carried out for the production of Sudanese cotton and wheat for export. Not

until the railroads are built can such commodities be exported at a cost of transport that is not prohibitive.

**Report on the Climate and Weather of Baltimore and Vicinity. By Oliver L. Fassig.** Maryland Weather Service. Special Publication, Vol. II., Part 1b. 4to. Baltimore, 1905. Pp. 148–309.

Part 1a of the new *Report on the Climate and Weather of Baltimore and Vicinity* was reviewed in this BULLETIN for November, 1904, pp. 707–709, and what was said regarding Part 1a of this volume is true also of Part 1b, which has now been issued. This portion completes the Report on the *Climate* of Baltimore, Part II, which is promised for June 1st, or thereabouts, will comprise the Report on the *Weather* of Baltimore, and will also contain the introduction, table of contents, and index of the whole volume.

The present part (1b) deals with humidity, precipitation, sunshine and cloudiness, winds, and electrical phenomena. It also contains, at the end, an historical account of the observations and the instrumental equipment at the Baltimore station of the Weather Bureau. The same completeness of discussion, the same abundance of illustration, numerical and graphic, and the same appreciative attention to details are noted in Part 1b as were pointed out in connection with Part 1a. It is a great satisfaction to find so laborious a piece of work as this, and one which was much needed as a pattern for other studies of like character so thoroughly done. The diagrams that particularly attracted the reviewer's attention were the selected relative humidity charts (Pl. VIII), with their emphasis on the *weather* element; the average hourly wind direction (Pl. XI), the westerly winds being in blue and the easterly in red, and the diagram showing a remarkable abrupt change in direction from westerly to easterly at about noon during all months except those of winter, the prevailing monthly directions of the wind in warm, normal and cold seasons and years (Fig. 76), and a series of plates (XIII to XVII) in which eight selected factors, expressed as departures from the normal climatic conditions at Baltimore, are presented for each season and year from 1871 to 1904.

The second volume of this Report is awaited with interest.

R. DEC. W.

**International Catalogue of Scientific Literature.** Second Annual Issue. F. Meteorology, including Terrestrial Magnetism. 8vo. London, September, 1904. Pp. 296.

The second annual issue of the volume on meteorology of the International Catalogue of Scientific Literature contains the titles for 1902, as well as some for 1901, which were omitted from the first issue. It is a satisfaction to note that the singular omission of all titles in the *Meteorologische Zeitschrift*—the most important meteorological journal in the world—which characterized the first volume of Meteorology, has been made good, the present issue containing the omitted 1901 titles, as well as those for 1902. The same thing is true of the *Sitzungsberichte* and the *Denkschriften* of the Vienna Academy of Sciences. But there are omissions in the case of papers published in the *Monthly Weather Review*. We note with pleasure the indexing under more than one subject-heading of papers which deal with matters which can be classified under different headings. Altogether the second issue is a considerable improvement over the first, and we do not doubt that the improvement will continue in future years.

R. DEC. W.

**Choiseul und die Katastrophe am Korouflusse. By Dr. Willy Marcus.** 79 pp. and Sketch Map. M. & H. Marcus, Breslau, 1905. (Price, M. 2.40.)

The complete story of one of the most tragic incidents in colonial history—the death of thousands of French emigrants who were induced to settle at the mouth of the Kuru River, northwest of Cayenne, in French Guiana, in the latter part of the eighteenth century. They were helpless and ignorant in a deadly climate, without proper supplies, and were left practically to their fate until nearly all had died of disease or hunger. The "Précis historique de l'expédition du Kourou" was published in Paris in 1842, but this is the first time that the detailed story has been told in German.

**Durch die Libysche Wüste zur Amonsoase. Von Georg Steindorff.** 163 pp., 113 half-tone illustrations, Bibliography and Index. Velhagen & Klasing, Bielefeld and Leipzig. 1904.

This addition to the "Land und Leute" series of geographical monographs is a popular account of the archæological journey made by Prof. Dr. Steindorff from Cairo through the Libyan Desert to the Siva oasis and return, in Nov., 1899–Jan., 1900 (BULLETIN, 1900, p. 680). It is one of the most valuable of the series, for it deals with a region of which much remained to be told, though several modern explorers have visited it; and long before the Christian Era the Greek city of Kyrene sent many caravans to Siva for the dates and salt of the Libyan waste. None of the recent travellers obtained such fine photographic results as the splendid views brought home by Dr. Steindorff and his companion, Baron von Grunau. They are reproduced in this volume, and give a very clear idea of the routes, oases, settlements, ruins, and desert aspects of this region. The extraordinary clearness of the atmosphere helps the photographer, and the results are exceptionally good.

**Northern France from Belgium and the English Channel to the Loire, excluding Paris and its Environs. By Karl Baedeker.** (Fourth Edition.) xxxvi and 423 pp., 13 maps and 40 plans. Karl Baedeker, Leipzig, 1905. (Price, M. 7.)

This work corresponds with the seventh French edition of this well-known handbook for travellers. There are large-scale plans of all the more noteworthy places which, with the maps, enable the tourist to ascertain his bearings in the towns and to select the most convenient routes through the country.

**With the Pilgrims to Mecca. By Hadji Khan and Wilfrid Sparroy.** With an introduction by Professor A. Vambery. 314 pp., 25 illustrations from photographs, appendix and index. John Lane, New York and London, 1905. (Price, $3.50.)

Burckhardt, Burton, Maltzan, Hurgronje, and others have described Mecca and the pilgrimages to it. Here is an addition to the list with a distinctive claim to attention, because it was written not by an alien and unbeliever, but by an educated follower of Islam. In the words of Professor Vambery: "We have been in need of just such an account of the pilgrimage written by a Mohammedan, not attracted by curiosity but by religious piety, who had every access to holy places, who was not hindered with the fear of being discovered as a Christian, and who is possessed of a shrewd observation."

The pilgrimage described is that of 1902, which is one of the largest yet counted. The author places the number of pilgrims at 220,000. When Burckhardt visited the

XUM

holy city in disguise he calculated the number at 70,000; Burton, in 1850, found the number reduced to 50,000. The author says a growth in tolerance among the Mohammedan sects is plainly evident, and this points to renewed unity among those races that hold the faith of Islam.

The narrative, absorbing in interest, is divided into three parts: the first describes the aspects of the social life and faith; the second, the journey to the holy city and the interesting ceremonies there, such as the compassing of the Ka'bah, the visit to Arafat, and the Day of Victims; the third section depicts various scenes in Mecca, phases of life there and religious institutions, such as the use of talismans and healing by faith. Mr. Sparroy, who was tutor to the children of the Shah of Persia over fifteen years, collaborated in preparing the book for the press and wrote the appendix, which discusses the condition of Islam in regard to slavery. The photographs were taken by the author—a proceeding by no means orthodox, and involving some personal risk.

**Aus Südwest-Afrika.** Blätter aus dem Tagebuche einer deutschen Frau, 1902–1904. 188 pp., and 24 half-tone Illustrations. Veit & Co., Leipzig, 1905. (Price, M. 3.50.)

These are bright sketches of life among the German pioneers and the natives in German Southwest Africa, with many allusions to the physical conditions of the country. The writer and her husband travelled over a large part of the central regions, where most of the German officials and immigrants are settled. She shows the vivid contrast between the sandy waste of the coastal zone and the mountainous interior, where the climate is inviting and the verdant valleys are beautiful. Life among the pioneer farmers is depicted, with its hardships and unexpected vicissitudes. The writer describes with pen and picture the achievements of some of these brave men and women who spread over bits of the wilderness the charm of utility and comfort. The pathos of their fate in the present Herero uprising, the tragic end of their twenty years of struggle, are, perhaps, nowhere else so feelingly emphasized.

**Die Zukunft Deutsch-Südwestafrikas. Von Dr. Georg Hartmann.** pp. 31. Mittler & Son, Berlin, 1904.

This colony, about a third larger than Germany, is, in the author's opinion, neither one of the best nor one of the least valuable of the steppe regions. In addition to its thirsty wastes, it has large areas adapted for cattle and sheep raising, and valleys where general farming is successfully pursued; and he points to Cape Colony, Algeria, Argentina, and Australia, all of which produce millions of live stock and great value in agricultural products under similar semi-arid conditions. The mineral resources of the colony are also very important. Dr. Hartmann believes that German Southwest Africa will richly pay for development, and that Germany may ultimately obtain from this source the wool which she so largely imports. He regards the two recent native uprisings as local phenomena, whose repetition may be prevented; and he thinks the next twenty years should see at least 10,000 to 15,000 families of German peasants, numbering 50,000 to 60,000 persons, settled in the colony and developing its agriculture and stock-raising.

**Lettres d'Afrique du Colonel Baron Lahure: Maroc et Sahara Occidental. Préface par Edmond Picard.** ix and 136 pp., portrait and 3 illustrations after water-colors by the author. Oscar Lamberty, Brussels, 1905.

Col. Lahure, an officer in the Belgian army, wrote these letters while on a Gov-

ernment mission in 1888 to northwest Africa, during which he saw much of Morocco and the western Sahara. He was greatly impressed both with the indications of large natural resources in Morocco and the determination of the governing class that foreigners should not profit by them. He wrote that, after great effort and the lavish distribution of money among influential persons at court, a mining concession might be obtained, but the Sultan would manage indefinitely to delay the enterprise or ultimately forbid any attempt to carry it out. Soon after his return home the author fell a victim to a malady contracted on this journey.

**Vedic India, as Embodied Principally in the Rig-Veda. By Zénaïde A. Ragozin.** xii and 457 pp., Map, 35 Illustrations and Index. G. P. Putnam's Sons, New York, 1902. (Price, cloth, $1.50.)

This book describes the thoughts and customs (chiefly religious) of the ancient Aryan settlers in the Punjab, and gives much space to geographic influences. It opens with a general description of India, emphasizing especially the influence that the Himalayas, the monsoons, and the variety of climate and vegetation have had upon the physical and mental development of the people. A brief description follows of the life of the Indo-Iranians, that greater and more numerous nation, lying somewhere in the interior of Asia, the ancestors of the Aryan Hindus and Iranians. This people, the author says, was "rude and primitive, but by no means what is usually understood by a 'very young people.'" The fact that the words *father*, *mother*, *brother*, *sister*, *widow*, etc., have similar roots (modifications being consequent on the character of the language), in almost all the languages of the Aryan stock, shows that these words existed in the language of the Indo-Iranians, consequently that they had reached the stage of family organization. In the same way it is shown that they tilled the soil, made stone weapons, used gold and silver, dwelt in houses with doors, and wore clothing of skin or of spun and woven wool. The presence of the word *cow* is of great importance, showing that they had reached a settled stage of existence, because the cow, unlike the sheep, is incapable of bearing the hardships of a nomadic life. Of equal importance is the absence in the Aryan languages of any common root for *sea* or *ocean*, indicating that these people lived in an interior land, knowing nothing of the ocean.

The early history of the Aryans, who separated from this ancestral stock, and, after long wanderings, settled in the Punjab of India, forms the subject of the book. Material is found principally in the Rig-Veda, a collection of 1,028 hymns and sacred texts. Miss Ragozin takes up first the cycle of the older Vedic gods, who can be traced with absolute certainty to an Indo-Iranian past, and identified with corresponding divine beings in the Avesta; then the myths and gods of Indian growth, bearing the unmistakable impress of the land, and conditions of life which the Aryans found beyond the Himalaya and the Indus. The nature of the country mapped out their chief pursuits; agriculture, and cattle breeding, with some pottery, carpentering, hide-tanning, spinning, and weaving. The climate was balmy but not enervating; the soil repaid labour, but would not support the race in idleness; there were wild animals to be kept at bay, and a brave and numerous native population to be defied. All these conditions were favourable to the development of a sturdy race.

The author cites evidence, almost conclusive, that there was commercial intercourse between Dravidian India and Babylonia. One of the facts pointing in this direction is that the old Babylonian name for *muslin* was *sindhu—i. e.*, it was called by the name of the country which exported it. This is corroborative evidence that the

XUM

Aryan settlers of Northern India had already begun to excel in the manufacture of muslin, and that their Dravidian contemporaries were enterprising traders; it was certainly not the Aryan export trade which supplied the foreign markets with it, for the Aryans of the Punjab were acquainted neither with the sea nor with the construction of sea-going ships; it was the Dravidian traders who collected the surplus left over from home consumption, the goods then finding their way to some commercial centre on the western coast, where the large vessels lay which carried on the regular export or import trade.

The author points out that the very first hints of the caste system are found in the Vedic period, though it did not develop until the later Brahmanic period. Funeral, marriage, and sacrificial rites are described with fulness, and finally the cosmogony and philosophy of the Rig-Veda. Frequent extracts from the Rig-Veda add greatly to the interest of the book.

**Mediæval India under Mohammedan Rule, 712-1764. By Stanley Lane-Poole.** xviii and 449 pp., 59 illustrations, and index. G. P. Putnam's Sons, New York, 1903.

**Buddhist India. By T. W. Rhys Davids.** xv and 332 pp., 56 illustrations, and index. G. P. Putnam's Sons, New York, 1903.

These two books, as well as "Vedic India," reviewed above, are in the well-known series of the "Story of the Nations," now far advanced. Mr. Lane-Poole is Professor of Arabic in Trinity College, Dublin, and Dr. Rhys-Davids is Professor of Pali and Buddhist literature in University College, London. Both gentlemen are recognized as leading authorities on their special subjects, and their volumes in these series illumine the historical phases of India of which they treat.

**The Blue Book of Missions for 1905. Edited by the Rev. Dr. Henry Otis Dwight,** Secretary of the Bureau of Missions. 242 pp. and index. Funk and Wagnalls Company, New York and London, 1905.

This is a compact directory of American and foreign missionary societies, showing the distribution of their work over the whole mission field. It describes the fields in alphabetical order, giving area and population of countries, with their religions, estimated or ascertained, number of adherents of each faith, missionary societies, number of churches, schools, etc.; also the largest cities in the mission fields, with population, a review of the missionary situation throughout the world, an enumeration of the Protestant missionary societies, with their statistics and aims, and many notes and tables, including a list of the Roman Catholic societies, and much information important for those who write about missions or have relations with them.

From a geographical point of view this compilation is important. Some of the best annuals giving geographic statistics attempt to show the distribution of religious faiths among each people. Their tables, however, are very defective, because of the inadequacy of information. This book is evidently inspired by an earnest desire to present accurately facts and figures showing the condition and progress of missionary work. In future editions it may be possible to remedy a few defects apparent in this issue. In all cases, of course, the best authorities should be consulted for areas, population, etc. The book gives the estimated population of the Congo Free State at 30,000,000, which is a common but a great exaggeration. The best approximation of the population now given (*Geographen-Kalender*, vol. 1) is 14,000,000.

XUM